UNIVERSITY OF LIMERICK
IRELAND

International Visiting Students

Module Booklet - Autumn 2025

Introduction

The University of Limerick operates a system with continuous assessment.

A Module is a self-contained package of education taught during a single academic semester. Visiting students may choose from a wide range of modules and may cross-register between faculties and departments. Acceptance of these modules is subject to academic pre-requisites timetabling constraints. The module descriptions to follow, present an outline of the subject topics covered in each module.

The normal course load is **FIVE** modules per semester (Which can vary depending on the home university).

Please Note: Module registration will be completed for you by the Study Abroad Team **post-arrival**.

Module	Faculty	Department
AC	BUS	ACF
AR	SEN	DES
BC	SEN	CSC
BY	SEN	BSC
CE	SEN	ECE
CG	SEN	CSC
CH	SEN	CSC
CS	SEN	CSI
CU	AHS	MLA
DM	SEN	DMT
EC	BUS	ECO
ED	SEN	ECE
EE	SEN	ECE
EN	EHS	EPS
EP	BUS	MMA
EQ	SEN	BSC
ER	SEN	CSC
ET	SEN	ECE
EV	SEN	BSC
FI	BUS	ACF
FR	AHS	MLA
FT	SEN	BSC
GA	AHS	EIC
GE	AHS	MLA
GY	AHS	HISGEO
HI	AHS	HISGEO
HS	SEN	CSC
IN	BUS	ACF
JA	AHS	MLA
JM	AHS	EIC
LA	AHS	LAW
LI	AHS	MLA
MA	SEN	MAS
MB	SEN	MAS
MD	HUM	HUM
ME	SEN	ENG
MF	SEN	DMT
MG	BUS	MMA
MN	BUS	MMA
MS	SEN	MAS
MT	SEN	ENG
MU	HUM	HUM
PA	AHS	PPA
PD	SEN	DES
PH	SEN	PHY
PM	BUS	WES
PO	AHS	PPA
PS	EHS	PSY
PY	EHS	PES
SO	AHS	SOC
SP	AHS	MLA
SS	EHS	PES
TE	AHS	MLA
TW	AHS	EIC
TX	BUS	ACF
WT	SEN	ENG

Module Code	Department
AC	Accounting & Finance
AR	School of Architecture and Product Design
BC	Chemical Sciences
BY	Biological Sciences
CE	Electronic and Computer Engineering
CG	Chemical Sciences
CH	Chemical Sciences
CS	Computer Science
CU	Modern Languages and Applied Linguistics
DM	Engineering
EC	Economics
ED	Electronic and Computer Engineering
EE	Electronic and Computer Engineering
EN	School of Education
EP	Management & Marketing
EQ	Biological Sciences
ER	Chemical Sciences
ET	Electronic and Computer Engineering
EV	Biological Sciences
FI	Accounting & Finance
FR	Modern Languages and Applied Linguistics
FT	Biological Sciences
GA	English, Irish and Communications
GE	Modern Languages and Applied Linguistics
GY	History and Geography
HI	History and Geography
HS	Chemicial Sciences
IN	Accounting & Finance
JA	Modern Languages and Applied Linguistics
JM	English, Irish and Communications
LA	Law
LI	Modern Languages and Applied Linguistics
MA	Management & Marketing
MB	Maths and Statistics
MD	Irish World Academy
ME	Engineering
MF	Engineering
MG	Management & Marketing
MN	Management & Marketing
MS	Management & Marketing
MT	Engineering
MU	Irish World Academy
PA	Politics and Public Admin
PD	School of Architecture and Product Design
PH	Physics
PM	Work & Employment Studies
PO	Politics and Public Admin
PS	Psychology
PY	Physical Education & Sport Sciences
SO	Sociology
SP	Modern Languages and Applied Linguistics
SS	Physical Education & Sport Sciences
TE	Modern Languages and Applied Linguistics
TW	English, Irish and Communications
TX	Accounting & Finanace
WT	Engineering

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Faculty of Arts, Humanities & Social Sciences

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

HISTORY AND GEOGRAPHY

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

History and Geography Year 1 Modules

HI4071 - DOING HISTORY: PAST, PRESENT AND PRACTICE
ECTS Credits: 6 (Year 1 Module)
School of History and Geography

Rationale and Purpose of the Module: The purpose of this module is to introduce history students, at the start of their primary degree programme, to the central significance of sources - whether primary or secondary - to gain an understanding of history as a discipline and especially how an appreciation of the nature of sources enriches the work of the history student as well as that of the professional historian.

Syllabus: Historians and their sources; primary and secondary sources; identification, location, accession, critical evaluation and use of sources; public and private archives; origins, ideologies and holdings; using archives: access, availability, procedure and professional practice; the range and scope of electronically available source materials; audio and visual sources; old histories and new histories; forgery, fabrication and the historian; the withdrawal, suppression and destruction of sources; professional practice and political necessity; appropriate citations of primary and secondary sources; presenting a small research project.

HI4152 - FROM KINGDOM TO REPUBLIC: IRISH HISTORY, 1660-1960
ECTS Credits: 6 (Year 1 Module)
School of History and Geography

Rationale and Purpose of the Module: This general history module will provide those with little or no prior experience of history with an overview of Irish society and politics from c.1660 to 1960. It is ideal for the general arts student, the international student and those who wish to have a general introduction to Irish history.

Syllabus: Defining Ireland; economy, society and class; women and politics; the Three Kingdoms; the Boyne and the emergence of a protestant ascendancy; an agrarian society in pre-famine Ireland; the Famine: dealing with the catastrophe; patriots, nationalists, republicans, unionists, and others: politics and its followers; origins of independence; constitutional developments and the two states of Ireland; economic development; population and social change; education and language; the evolution of popular culture; the Irish diaspora.

GY4001 - INTRODUCTION TO HUMAN GEOGRAPHY
ECTS Credits: 6 (Year 1 Module)
School of History and Geography

Rationale and Purpose of the Module: This module introduces students to the study of people and communities in their environment and how social, cultural, economic, and political interactions shaped it. It seeks to communicate an understanding of key concepts of information, an evaluation and synthesis of a variety of types of geographical information and qualitative and quantitative data, and an ability to construct sustained written arguments on geographical issues.

Syllabus: The module explores the interrelationships between human processes and the environment in their local, regional, and global contexts. Students will be introduced to the key thinkers, ideas, theories, and contemporary issues in Human Geography. It examines the key social, economic, political, demographic, environmental and cultural processes evident across the globe in contemporary and historical contexts. Themes include population and migration; cultural patterns and processes; political organization of space; urban and rural land use; agriculture, food production, and rural land use; industrialization and economic impacts; climate and environmental issues; cultural systems and identity; development and sustainability.

GY4004 - GEOGRAPHY RESEARCH PROJECT FOR ERASMUS

ECTS Credits: 6 (Any year Module)

Limited Spaces available: 4

Note: Registration at discretion of UL Geography staff

School of History and Geography

Rationale and Purpose of the Module: This optional module will allow students of geographic disciplines, who are visiting the University of Limerick on Erasmus, to engage in active learning through participation in research projects led by UL Geography staff. Students will have the opportunity to learn directly from staff, on their main areas and methods of expertise.

Syllabus: Students taking this module will choose a supervisor and a research project in consultation with Geography staff. They will conduct research on this project under the guidance of their supervisor, which may include elements of literature review, field data collection, laboratory data collection, data presentation, creation of graphic or cartographic outputs, or data analysis (including GIS).

History and Geography Year 2 Modules

HI4063 - NASTY, BRUTISH AND SHORT? EARLY MODERN EUROPE, C. 1450-1700

ECTS Credits: 6 (Year 2 Module)

School of History and Geography

Rationale and Purpose of the Module: This module aims to give students a thematic and chronological overview of the history of continental Europe during the sixteenth and seventeenth centuries. It is intended as an introduction to the early modern period, combining various aspects of the discipline expected to appeal to second-year students.

Syllabus: The waning of the Middle Ages and the culture of the renaissance; the political geography of early modern Europe - republics, new monarchies and composite polities; Europe in the broader context of the discovery of America and the rise of the Ottoman empire; society: orders, minorities and outsiders; family life - birth, marriage and death; humanism and education; confessionalization in the Holy Roman Empire; Wars of Religion in France and the Netherlands; Philip II and Spanish world hegemony; the Thirty Years' War and the military revolution; congress diplomacy at Westphalia, the Pyrenees, Nijmegen and Utrecht-Rastatt; the witch craze and its critique; the scientific revolution; Dutch economic primacy; gender and women; court society and the world of the minister-favourite; France and Spain in the age of Louis XIV and Carlos II; Austrian expansion into the Hungarian plain; the partition of the Spanish Monarchy in 1713-14.

HI4083 - MAKING IRELAND BRITISH: EARLY MODERN IRELAND, 1536-1750

ECTS Credits: 6 (Year 2 Module)

School of History and Geography

Rationale and Purpose of the Module: To provide a survey of sixteenth, seventeenth, and early eighteenth-century Irish history.

Syllabus: The Anglo-Irish and Gaelic lordships; Tudor Reform and Reformation; the Tudor conquest (1579- 1603); British settlement in Ireland; The crisis in the three kingdoms and the
1641 rising; the Catholic Confederates; Cromwellian reconquest and settlement; demographic and social trends in Restoration Ireland; The War of the Three Kings 1685-91; patriotism and the Irish parliament.

HI4103 - IMAGINING IRELAND: FROM EARLY MODERN TO MODERN

ECTS Credits: 6 (Year 2 Module)

School of History and Geography

Rationale and Purpose of the Module: This module centres on how Ireland and Irishness was imagined by people from the early modern to modern periods. The imagining of history is a key trend in popular culture and therefore, students need to be provided with the skills to deconstruct representations of the past and to
interrogate their own working assumptions about history. Using a chronological approach examining key events, themes, and milestones from the Battle of Kinsale in 1601, to the collapse of the Irish economy in the early twenty-first century, it covers political, social, economic, and cultural dimensions of Irish history during tumultuous times. However, three large themes will be examined throughout the module - nation and state-building: identity formation and the experience of life. Issues to be addressed will include Ireland's transition from a traditional to modern society, economy and polity, language, gender, religion and how the broader European, Atlantic, and global framework influenced the imagined 'nation'. The modules enable students to examine the ways in which the past has been presented, interpreted, and reinterpreted in various genres; uncover the assumptions or agendas behind representations and reflect critically upon how Ireland has been and is imagined using the critical methods of historical enquiry.

Syllabus: Land of saints and scholars? Origins of Ireland's various identities; imagining ascendancy Ireland; Irish culture, religion, and language; the nation depicted by competing interests: political

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GY4051 - EARTH SCIENCE AND SOCIETY

ECTS Credits: 6 (Year 2 Module)

Limited Spaces available

Note: Places may be limited due to capacity TBC

Lab based module – 2 hours a week in geography lab

School of History and Geography

Rationale and Purpose of the Module: Understanding of Earth science is fundamental to Geography, and is a core part of the Geography curriculum at all levels. This module introduces students to the key processes and materials in Earth science. It considers the range and origin of these materials, and will provide students with the skills to describe and analyse these materials and the knowledge to understand their development and meaning. It will also demonstrate the importance of earth science through its impact on society, considering the influence of geological processes and features on human geographic processes, including settlement patterns, agriculture, and economic activity.

Syllabus: This module will introduce the fundamentals of earth science, and how it influences society. Through exploration of the geological history of Ireland and beyond, students will consider how geological evolution has helped to shape human geography, including settlement patterns, agriculture, and economic activity. Topics to be covered may include the formation of the solar system and the Earth; the structure of the Earth and plate tectonics; igneous, metamorphic, and sedimentary rocks, minerals, and processes; environments and landscapes; the fossil record and biogeography; economic geology, including mining and petroleum geology; and geoenvironmental engineering and management.

GY4033 - POPULATION DYNAMICS

ECTS Credits: 6 (Year 2 Module)

Limited Spaces available: 5

Note: Size is limited due to computer lab capacity

Lab based module: Computer labs make up 2 hours per week.

School of History and Geography

Rationale and Purpose of the Module: This module aims to introduce students to key concepts in population studies. Through an analysis of the key demographic processes, fertility, mortality and migration, students will learn how source data, calculate and interpret key demographic indicators, assess trends and disparity at different scales, and link these with the population dynamics of historical, cultural, health, economic, political and environmental issues.

Syllabus: Population dynamics play a vital role in culture, health, economics, politics, and environmental issues. Grasping the basic concepts and tools of population geographies is essential to understanding this broad and varied subject area. Key geographical and historical processes of population change such as fertility, mortality and migration are introduced, as is the varied temporal and spatial nature of the causes and consequences of population disparities in history, the present, and into the future. The module examines these relationships through a variety of case studies and introduces key methods and tools for analysing population dynamics in contemporary and historical contexts.

History and Geography

Year 4 Modules

HI4247 - EMPIRES, NATIONS AND UNION: EUROPE, 1848 - 1992

ECTS Credits: 6 (Year 4 Module)

School of History and Geography

Rationale and Purpose of the Module: The aim of this module is to examine significant political, social, and cultural aspects of modern life in Europe. This module will, therefore, probe some of the key social and cultural transformations of the nineteenth and twentieth centuries and discuss the key political issues and events that have defined that period.

Syllabus: Introduction to the course: war, revolution, restoration 1848-1924; European societies at war; revolutionary situations/regime change; restoration of order democracy/ dictatorship and war 1924-44; American money and reconstruction; decadent decade? jazz, cocaine and sex; depression and sobriety; political mobilization and violence; authority restored; conservatism/fascism/Stalinism; the twenty-year crisis: international relations; the Nazi new order and total war; Holocaust; reconstruction/Cold War 1944-74; 1945: Europe's 'zero hour' re-establishing order: Europe's political divisions; recovery, growth, and limits: the European economy; seducing Europeans: mobility, consumerism, and culture; the 'second sex'; feminism and post-feminism; turning tides: youth, political protest and cultural revolt; the post-post war society and state (1970s-90); rebuilding the European house: Thatcher and Gorbachev; Which Europe? race, ethnicity, and memory; after the Wall: the return of 'Europe'.

GY4037 - A SUSTAINABLE WORLD?

ECTS Credits: 6 (Year 4 Module)

School of History and Geography

Rationale and Purpose of the Module: A Sustainable World provides students with the opportunity to engage with the growing field of geographical research on the relationships between social and environmental processes through the lens of sustainability. Beginning with the origins of sustainable development the module looks at the core ideas that underpin it and then considers how we are planning for a sustainable future. The key challenges derived from conflicting ideas and interests are discussed at varying local, national and international contexts.

Syllabus: Using a series of historic and contemporary case studies, the module explores sustainability from a variety of environmental and societal contexts (social, cultural and economic) and analyses the differing approaches and conflicting messages and ideas at play in today's world. Beginning with the origins of sustainability, the module will introduce topics such as global issues in sustainability, consumption and waste, business and industry, public policy, education, the role of technology, sustainable cities and sustainability and the future.

GY4005 - NATURAL HAZARDS

ECTS Credits: 6 (Year 4 Module)

School of History and Geography

Rationale and Purpose of the Module: As Earth's growing population makes demands on the use of more marginal and hazard prone lands, more and more people are becoming exposed to risk from relatively low frequency but high magnitude natural events - for example, the 2004 Indian Ocean tsunami, 2005's Hurricane Katrina in New Orleans, the 2010 eruptions of Mount Merapi in Indonesia and Eyjafjallajokull in Iceland, the 2011 Tohoku earthquake in Japan, the 2019-2020 wildfires in Australia, and the COVID-19 pandemic. Technological development also increases our exposure to natural hazards, such as perturbations in the Earth's magnetic field, or solar flares, which would not have impacted pre-technological civilisation. The study of such natural hazards, and consideration of measures for adaptation and mitigation, are therefore more crucial than ever. This module provides a topical and adaptable focus to the study of these natural hazards, using examples from the present and the geological past.

Syllabus: This module will examine the nature, extent, frequency, risk, and potential for mitigation against a range of natural hazards, including volcanic eruptions, earthquakes, tsunamis, storm surges, flooding, wildfires, pandemics, extreme weather, the climate crisis, and extraterrestrial hazards. Drawing heavily on case studies, including media coverage and the academic literature, students will explore these hazards from both physical and social geographic perspectives. They will consider the causes and geographic distribution of these natural events, as well as examining how risk, vulnerability, and consequences vary in different geographic areas due to geology, geomorphology, hydrology, demographics, socioeconomic factors, and more. They will develop the skills necessary to assess the hazardousness of particular geographic areas, and how to cartographically illustrate risk by creating hazard maps.

LAW

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Law Year 1 Modules

LA4001 - LEGAL SYSTEM AND METHOD
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To introduce the discipline of law through an examination of the functioning of the legal system, sources of law and legal methodology.

Syllabus: The concept of law, common law, civil law in Europe. Classification of law: municipal, international, substantive, procedural, public, and private. The administration of justice in Ireland. Sources of law: common law, legislation, the Constitution, European law. Elements of the Constitution of Ireland. Legal reasoning and methodology.

LA4021 - CHILD LAW
ECTS Credits: 6 (Year 1 Module)
Law
Rationale and Purpose of the Module: The desire to protect children from harm and to recognize their rights as autonomous individuals is an increasingly accepted goal in legal scholarship. The aim of this module is to consider the rights of children and how they may be advanced by the legal system. This involves gaining an understanding of the protection of children's rights both at domestic and international levels, as well as considering specific aspects of the law which impact upon children's lives.

Syllabus: This module covers: children's rights in the
Irish Constitution, the European Convention on Human Rights, and the United Nations Convention on the Rights of the Child; child participation and representation in legal proceedings; child protection and children in care; youth justice; garda vetting procedures and mandatory reporting of child abuse; bullying; child abduction; adoption and education.

LA4022 - COMMERCIAL LAW
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To familiarize the student with the legal background of commercial transactions.

Syllabus: Contracts for the sale of goods, consumer protection, reservation of title clauses, hire purchase and leasing. Commercial contracts of agency, bailment, carriage of goods by land, sea, and air. Financial services law, negotiable instruments, cheques, electronic transfer of funds, free movement of capital within Europe, European banking regulation. Intellectual property rights, trademarks, copyright and patents, creation, protection, endurance, and profit. Regulation of competition policy, national and European, comparative view of US antitrust legislation, enforcement mechanisms, the relationship between intellectual property rights and competition abuses. Remedies at Law and Equity, alternative mechanisms for dispute resolution, arbitration, private courts, negotiation. Bankruptcy, personal versus corporate, historical evolution, philosophical basis, Bankruptcy Act 1988, comparative views from the U.S.

LA4034 - JURISPRUDENCE
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To acquire a variety of theoretical perspectives on law through an examination of its nature and operation and an analysis of key concepts and issues.

Syllabus: Schools of jurisprudence: positivism, classical and modern. Kelsens pure theory of law. Natural law theories. Historical and anthropological theories. Sociological jurisprudence. Legal realism. Marxist theories of law. Critical legal studies. Economic analyses. The operation of the law: precedent; statutory and constitutional interpretation. Theories of adjudication; Dworkins rights thesis. Key legal concepts include theories of justice and Hohfelds analysis. Key issues such as

morality and the law and the duty to obey the law.

LA4111 - CONTRACT LAW 1
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To provide the legal basis for the creation and enforcement of contracts and to examine what restrictions exist regarding freedom to contract.

Syllabus: Formation of contracts: offer and acceptance, intention, doctrine of consideration. Formal and evidentiary requirements: void, voidable and unenforceable contracts. Construction/interpretation of contracts: intention, parol evidence, express and implied terms. Public interest restrictions on contractual freedom: capacity, illegality, privity, competition policy, doctrine of restraint of trade, consumer protection.

LA4068 - CRIME AND CRIMINAL JUSTICE
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: The Crime and Criminal Justice module aims to critically evaluate the institutions and operation of the criminal Irish justice system from a comparative perspective. The module aims to introduce students to the main approaches and theories in the field of crime and criminal justice studies, and the mechanisms by which the criminal justice system responds to the incidence of crime. The module also examines the influence of the media influence on public attitudes towards crime, criminal justice processes and sentencing, criminal justice policymaking, reform and anti-crime initiatives.

Syllabus: Historical development of the criminal justice system. Models of criminal justice: due process versus crime control. Criminal justice values and policies. Human rights and the criminal justice system. The making of criminal justice policy: the Department of Justice, Equality and Law Reform; the National Crime Council; the Law Reform Commission; the role of Non- governmental Bodies. The influence of European institutions on the Irish criminal justice process. Influence of the media on the criminal justice process and policy implementation. Diversion from the criminal justice system including Garda cautions and prosecutorial discretion. Alternative processes in the criminal justice system: restorative justice; the Drugs Court. The juvenile justice system. Penal policy and rationales for sentencing. Sentence management and the treatment of offenders; conditions of imprisonment; scrutiny of the prison system including judicial review and visiting committees; the Inspector of Prisons and Place of Detention. The adoption of civil mechanisms in the criminal justice system: seizure of criminal assets and other proceeds of crime; anti-social behavior orders.

LA4211 - CRIMINAL LAW 1
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To examine the general principles of criminal law through consideration of their ethical, social, and legal dimensions.

Syllabus: Historical and ethical consideration of criminal law, characteristics of a crime. Parties to a crime: principals and accessories, vicarious liability. The elements of a crime. Actus reus, conduct, omissions, status. Men's rea, intention, recklessness, criminal negligence. Men's rea in penal statutes. Offences of strict liability. General defences: insanity, infancy, automatism, intoxication, mistake, necessity, duress, self-defence. Inchoate offences: attempt, incitement, conspiracy.

LA4310 - LAW OF TORTS
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To evaluate critically the role of the law of torts in society, to examine the basic elements of a tort with particular emphasis on negligence and the defenses thereto.

Syllabus: Nature and function of torts: origin and development; alternative compensation systems; relationship of torts with constitutional law & EC law. General torts: negligence, breach of statutory duty - elements of a tort (breach of duty, damage, causation, remoteness). Areas of liability: nervous shock, negligent misstatement, economic loss, product liability, employers' liability, occupiers' liability, liability for defective premises, liability of administrative agencies. General defenses in tort. Parties: minors, the State, diplomats, corporate and unincorporated bodies, concurrent liability, vicarious liability.

LA4330 - LAW OF TORTS 1 (B)
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: To evaluate critically the role of the law of torts in society, to examine the basic elements of a tort with particular emphasis on negligence and the defenses thereto.

Syllabus: Nature and function of torts: origin and development; alternative compensation systems; relationship of torts with constitutional law & EC law. General torts: negligence, breach of statutory duty elements of a tort (breach of duty, damage, causation, remoteness). Areas of liability: nervous shock, negligent misstatement, economic loss, product liability, employers' liability, occupiers' liability, liability for defective premises, liability of administrative agencies. General defenses in tort. Parties: minors, the State, diplomats, corporate and unincorporated bodies, concurrent liability, vicarious liability.

LA4430 - CONSTITUTIONAL LAW 1
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: Currently, the School of Law delivers lectures on the Irish Constitution to all our LLB degrees and to a few FAHSS courses. These modules are entitled Public Law 1 and Public Law 2. The term Public Law is outdated and cumbersome. The two new modules being created will keep the content of the Public Law modules but will use the more commonly used name of Constitutional Law. It will be to the advantage of students, and professional bodies and employers with which they deal, as the term Constitutional Law bears the more commonly used term for the study of this area of law.

Syllabus: Constitutional Law I will examine the Irish Constitution from an institutional perspective. The course will examine how the Constitution regulates the legal framework of the Irish state and its institutions, including the interaction between these various institutions. Thus, during the course, fundamental issues such as sovereignty and the separation of powers will be examined. The historical development of the Constitution will be initially addressed, and then the powers and competencies of the various organs of government. The related issue of international obligations, including our obligations due to our membership of the European Union will be considered. Issues such as constitutional litigation and constitutional interpretation will also be considered.

LA4530 - COMPANY LAW 1
ECTS Credits: 6 (Year 1 Module)
Law

Rationale and Purpose of the Module: Currently, the
School of Law delivers two modules called Law of Business Associations 1 and 2. The name Law of Business Associations is outdated and cumbersome. The two new modules being created will keep the content of the Law of Business Associations modules but will use the more commonly used name of Company Law. It will be to the advantage of students, professional bodies and employers with which they deal, as the term Company Law bears the more commonly used term for the study of this area of law.

Syllabus: The aim of the module is to equip the

student with an understanding and knowledge of the basic principles and rules of Irish company law, including the concept of separate legal personality and exceptions thereto, corporate contracts, the nature of shares in private companies limited by share, the rights of shareholders, the remedies available to shareholders, the role of share capital and issues surrounding corporate borrowing and security. The policy reasons for individual rules are explained and the aim is to assist the students¿ understanding of company law, as well as to facilitate knowledge of those technical rules.

LA4610 - LAND LAW 1

ECTS Credits: 6 (Year 1 Module)

Law

Rationale and Purpose of the Module: To examine the fundamental aspects of legal control over real property, including the legal evolution of title.

Syllabus: The nature of land law and its historical evolution, the concept of estates and tenure. Freehold estates, fee-farm grants, fee simples, fee tails, life estates, pyramid titles, future interests, incorporeal hereditaments. Co-ownership. registration of interests in real property. Extinction of interests, adverse possession, merger. Disabilities.

LA4810 - EQUITY AND TRUSTS 1

ECTS Credits: 6 (Year 1 Module)

Law

Rationale and Purpose of the Module: To examine the growth and development of equity, particularly equitable doctrines, and equitable remedies available in the modern Court.

Syllabus: The nature of equity and historical development, maxims, equitable remedies - the injunction, specific performance, rescission, rectification, specific performance, estoppel. Equitable doctrines - conversion, election, satisfaction and ademption.

LA4901 - PRINCIPLES OF LAW

ECTS Credits: 6 (Year 1 Module)

Law

Rationale and Purpose of the Module: Principles of

Law is an introduction to law for non-law students.

Syllabus: The module provides the student with a basic knowledge of the Irish legal system, the Irish Constitution, the legal profession in Ireland, sources of Irish law, European Union law, Criminal law, and Tort law.

Law Year 2 Modules

LA4013 - MEDIA LAW

ECTS Credits: 6 (Year 2 Module)

Law

Rationale and Purpose of the Module: This course aims to make students fully aware of the legal

framework and constraints within which the media operates, and to enable them to cover courts and other stories with legal implications effectively and with confidence. It also aims to make students fully aware of the major ethical issues that concern journalists. Students will be able to form judgments about ethical dilemmas and articulate a response to them.

Syllabus: The structure of the legal system, with specific relevance to the law as it affects journalists, including defamation, malicious falsehood, criminal libel, blasphemy, contempt of court, reporting restrictions, breach of confidence and copyright. The course will introduce students to major sources (individuals, institutions, campaigning bodies, government bodies, journalists, journals) on media law issues. Students will analyze complex legal issues and be able to apply them to specific legal dilemmas. The course will cover recent developments in the laws on privacy and European human rights legislation. Students will be introduced to the ethical framework surrounding journalism, including the various codes of conduct, and touching

on laws such as those of privacy. They will discuss issues of public interest and its bearing on private lives, and the importance of truth, fairness, and objectivity. There will be discussions on reporting suicide, mental health issues, questions of taste and decency, the use of subterfuge to obtain stories, and the questions of sleaze and sensationalism. Representation of women and minorities in the press will be covered, as will the impact of competition, ownership, and advertising on journalism. Assessment will be by examination and coursework essay.

LA4033 - LAW OF THE EUROPEAN UNION 1

ECTS Credits: 6 (Year 2 Module)

Law

Rationale and Purpose of the Module: The aim of the module is to equip the student with an understanding and knowledge of the basic principles and rules of the European Union, including: the origins and character of European Union law, beginning with the three original Community Treaties, developments from the 1960s up to the Lisbon Treaty. Each of the Institutions will be examined: Parliament, Commission, Council, European Council, Court of Auditors, European Central Bank and the Court system. Sources of law-Primary (Treaties), Secondary (Regulations, Directives etc.), Case law of the Court of Justice of the European Union. Enforcement of EU law-Infringement proceedings (Article 258), proceedings for failure to act (Article 265), proceedings for failure to fulfil an obligation (Article 259); Preliminary References-Article 267; Legislative process-role of the institutions, Relationship between EU Law and national law-Supremacy and Direct Effect; Development of Human rights and the effect of EC/EU membership in Ireland.

Syllabus: The module covers, in the first instance, the history of the European Communities and the various Treaty amendments up to the Treaty of Lisbon. The module proceeds to consider the role, function and legislation powers of the Commission, Parliament and Council. The module will also examine the European Council, the Court of Auditors, and the European Central Bank. The Court system and the types of actions heard by the Court of Justice, the General Court and the Civil Service Tribunal will also be covered. The new legislative procedures, the ordinary legislative procedure and the special legislative procedure as introduced by Lisbon will be examined. The development of human rights and the principles of direct effect and supremacy will be considered. Finally, the evolution and impact of membership of the EC and EU on Ireland will be examined.

LA4073 - INTRODUCTION TO CRIMINAL JUSTICE

ECTS Credits: 6 (Year 2 Module)

Law

Rationale and Purpose of the Module: The module aims to introduce students to the main approaches and theories in the field of crime and criminal justice studies, and the mechanisms by which the criminal justice system responds to the incidence of crime. It is a study of major components of criminal justice in Ireland, which include concepts of law and crime, the criminal justice process, and overview of criminal justice agencies, current criminal justice issues, interactions, and conflicts between criminal justice agencies. The module also examines the influence of the media influence on public attitudes towards crime, criminal justice processes and sentencing, criminal justice policy making, reform and anti-crime initiatives.

Syllabus: Historical development of the criminal justice system. Models of criminal justice: due process versus crime control. Criminal justice values and policies. Human rights and the criminal justice system. Making of criminal justice policy. Influence of the media on the criminal justice process and policy implementation.

Law Year 3 Modules

LA4005 - LEGAL ENVIRONMENT OF BUSINESS

ECTS Credits: 6 (Year 3 Module)

Law

Rationale and Purpose of the Module: To provide students with a knowledge of the legal environment in which business operates and of the legal principles central to commercial life.

Syllabus: The concept of law. Legal systems: common law systems; the civil law systems; the European Union legal system. Sources of Law; precedent; legislation; the 1937 Constitution, the European Treaties. The administration of justice in Ireland, courts, and quasi-judicial tribunals; legal and equitable remedies. The role of law in the business environment, its function and methods, legal philosophy in business law. Core elements of private law. Contractual transactions: formation; formalities; capacity; contractual terms and obligations; standard form contracts; statutory regulation; discharge. Civil liability: negligence; statutory duties and remedies; economic torts: inducement to breach of contract; conspiracy; passing off; deceit and injurious falsehood.

Politics & Public Admin

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Politics and Public Admin

Year 1 Modules

PA4001 - INTRODUCTION TO PUBLIC ADMINISTRATION 1
ECTS Credits: 6 (Year 1 Module)
Politics and Public Admin

Rationale and Purpose of the Module: This module will introduce students to the study of Public Administration. It will identify the characteristics of Public Administration as an academic study and a practitioner focus. It will present the main ideas and concepts in the traditional model of public administration - bureaucracy, politics-administration dichotomy, scientific management - and their application. The module will then explore the rationale for contemporary ideas about public management and governance, reforming public sector organisations and attempts to deliver public services efficiently and effectively.

Syllabus: Part 1 Introduction: What is Public Administration? Differences between 'public' and 'private' Characteristics of public goods The role and functions of government Part 2 - Traditional Model of Public Administration Patronage and spoils to the Northcote-Trevelyan reforms Max Weber and bureaucracy Woodrow Wilson and the politics-administration dichotomy Public choice critique Part 3 - Reforming Public Administration Managerialism New Public Management E-government Accountability: theory and practice Street-level bureaucracy New Public Governance

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PO4051 - INTRODUCTION TO POLITICS AND INTERNATIONAL RELATIONS I
ECTS Credits: 6 (Year 1 Module)
Politics and Public Admin

Rationale and Purpose of the Module: This module will introduce studies to the themes and issues that exist in the study of Politics and International Relations. It will provide the first part of an introduction that will look at the basics of the study of Politics and International Relations. It will address questions about the nature and justification of the state, and its role in both domestic and international politics. The module will be offered on the Evening Degree.

Syllabus: What is Politics and International Relations? Power and Authority, State Development, Power in Modern States, Political Obligation in Classical Political Thought, Political Obligation in Contemporary Political
Thought, States and Nonstate Actors in International Politics, International Organizations, Globalization and Regionalism.

Politics and Public Admin

Year 2 Modules

CW4003 - ACTIVE LIVING
ECTS Credits: 15 (Year 2 Module)
Politics and Public Admin

Rationale and Purpose of the Module: The aim of this module is to provide a detailed overview of the management of health and well-being across the lifespan. Students will learn about the theoretical principles underlying the management and treatment of health and well-being which will include biological, psychological and social applications to advance positive well-being. Students will also explore ways of fostering positive coping strategies and resilience within the individual, the family and the community as a means of preventing or reducing the burdens associated with physical or mental ill health. The graduate attributes developed by participation in this module are 'knowledgeable' and 'creative'. Students will be encouraged to think critically about health and well-being and interventions/treatments. Students will have opportunities to identify and consider a wide range of positive coping strategies.

Syllabus: In this module, students will learn about the theoretical foundations underlying the

management and treatment for positive health and well-being. For this, the role of social, psychological, and biological factors in the prevention, management and treatment of health and well-being will be taught to students. An experiential and critical reflective approach will be developed in students where they will explore the most effective methods of applying preventive and treatment measures to foster positive health and well-being.

PA4003 - ISSUES AND CONCEPTS IN DEVELOPMENT

ECTS Credits: 6 (Year 2 Module)

Politics and Public Admin

Rationale and Purpose of the Module:

Foundations of Development aims to provide students with an understanding of the key theories, concepts and methods that inform thinking about international, national, regional, and local development. The module will explore some of the historical experience of international development, as well as some of the most significant contemporary policy debates. A conception of development as the outcome of rapid national economic growth and industrialization on a universal model emerged in the wake of the Second World War. Development doctrine has since been shaped by neoliberal globalization, but also by concerns about the need for sustainable, participatory and gender sensitive processes at all levels of governance. The module charts these shifts in thinking about development as well as the tensions between approaches in the mainstream. It draws on varied critiques of development and its effects to evaluate its possibilities and limitations. It takes account of the challenge presented by environmentalism and considers alternative ideas on how to address global inequality.

This module will be offered on the new BA Arts programme.

Syllabus: The module will consist of the following topics:

1: What is development?
2: Modernization theories
3: Dependency theories
4: The Washington Consensus
5: Good governance
6: Human development
7: Social movements and NGOs: Development from Below? 8: Gender and development
9: Sustainable development
10: post-development

PO4013 - GOVERNMENT AND POLITICS IN IRELAND

ECTS Credits: 6 (Year 2 Module)

Politics and Public Admin

Rationale and Purpose of the Module: To introduce the principal institutions of Irish government and politics and to examine their relationship to Irish society.

Syllabus: Historical introduction to the economic, cultural, and social background of Irish politics; economic, social and political change; Irish political culture; constitutional development; development of political parties and evolution of the party system; electoral behaviour; social bases of party support; overview of the principal political institutions, including the presidency, the Oireachtas, the Government, the Taoiseach and the civil service.

PO4023 - COMPARATIVE EUROPEAN POLITICS

ECTS Credits: 6 (Year 2 Module)

Politics and Public Admin

Rationale and Purpose of the Module: This course introduces the comparative study of European politics. It provides students with the opportunity to study political trends across Europe, to identify similarities and differences within different countries, systems, and regions, and to develop their ability to conduct comparative political analysis.

NB: This course will mainly draw on Western and Central European political systems.

Syllabus: The basic themes of the course are, first, the commonalties and, secondly, the particularities, of politics and government among West European states û due largely to their similar yet different trajectories of development, and to the way in which they influence each other. We explore, for example, why politics in some West European countries is very stable, even predictable, whereas in other countries politics is highly fractious; why some countries have single- party governments whilst others are (almost always) governed by complex coalitions; why some polities seem to be well-governed whereas governance seems more haphazard in others. Note, too, that an understanding of politics and government in West European states tells us much about what is involved in building democracy in the new states of Eastern and Central Europe and indicates some of the difficulties entailed in European integration û both of which are areas of study in third-year courses.

Prerequisites: PO4011

PO4033 - POLITICAL THEORY

ECTS Credits: 6 (Year 2 Module)

Politics and Public Admin

Rationale and Purpose of the Module: This module will cover the basic concepts in contemporary political theory, building on the ideas introduced in PO4022 Modern European Political Thought. The goal is to develop a clear understanding and mastery of the main concepts and ideas in political theory.

Syllabus: PO4022 Modern European Political Thought introduced students to the basic concepts in political theory via a historical narrative that stressed the richness of political thinking. This module takes the key concepts in contemporary political theory, that were introduced in PO4022, and presents a deeper understanding of their role and relevance in the contemporary world. Concepts covered in the module will include democratic theory; modern political ideologies; tolerance and multiculturalism; national identity and citizenship and political mortality. Students will be introduced to the different approaches within political theory, as well as how the concepts discussed in this module relate to broader issues within political science. Prerequisites: PO4011, PO4022

UP4201 (AUTUMN PRACTICUM) - GUIDE FOR CWELL PRACTICUM STUDENTS SUPPORTING CWELL MODULE CW4003: ACTIVE LIVING

ECTS Credits: 6

(Year 2 Module)

Academic Contact: If interested in this module, please contact Eileen.Hoffler@ul.ie.

Limited places available: 4-5

Note: This module is delivered in a city centre location and is held on Wednesday evenings between 18:30 & 21:00

Politics and Public Admin

Year 4 Modules

PA4007 - CAREERS AND INFLUENCE IN PUBLIC LIFE

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: This module introduces students to the roles of institutions and individual attributes in shaping ministers' and civil servants' careers and policy influence. The interactions of ministers and civil servants are central to the functioning of democratic political systems, yet these actors have different incentives and career patterns. The module provides students with a grounding in Principle-Agent theory as it is applied to ministerial and civil service careers and to delegation and accountability in democratic systems. It takes a comparative, cross-national perspective, allowing students to become familiar with the institutions and norms that shape these careers in European democracies. In doing so, it broaches issues such as representation, gender balance, generalist and specialist recruitment, technocratic government, and accountability.

Syllabus: The course is structured around a series of career outcomes: selection, de-selection, and policy influence, as well as career prospects after a spell in office. It examines factors that influence these outcomes, including gender, age, the nature of the individual's experience (including the special case of civil servants who become ministers), and performance. Informed by the course's cross-national perspective, we consider institutional variations and reforms, in areas such as remuneration, pay-for-performance, gender quotas, term limits, and generalist (or specialist) recruitment. We also look at the minister-civil servant relationship in a more general sense: how do these actors work together effectively? Who is accountable? What are their incentives?

PO4018 - INTERNATIONAL RELATIONS

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: Provides an overview of some of the theoretical debates and issues that have underpinned the study of International Relations (IR). Theoretical perspectives such as Realism, Liberalism and Structuralism will be introduced and this will allow students to apply these to the arena of world politics and to processes such as the interactions of states, the workings of international organizations and the global economy.

Syllabus: The module introduces the theoretical perspectives within International Relations (IR) - Realism; Liberalism; Structuralism; Critical Theory; Post-Modernism; Constructivism; Feminism. It then introduces the major aspects of study within IR - Power; Security; War and Peace; Foreign Policy and Diplomacy; International Political Economy; International Organizations.

PA4037 - PUBLIC ADMINISTRATION AND SOCIAL JUSTICE

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: The purpose of this module is to enable students to interrogate the roles and responsibilities of public administration in the promotion and production of social justice outcomes. It is introduced to broaden students' appreciation of the actual and potential place of public administration in contemporary society. This module will be offered on the new BA Arts programme.

Syllabus: This module is delivered in two parts. Part 1 will focus on establishing the foundations upon which consideration of public administration and social justice can be built. It does so by presenting the main theoretical approaches to social justice and by looking at the main discourses that inform public policy considerations of social exclusion/inclusion. It also outlines the range of potential influences on thinking about social justice including constitutional obligations; national and international legislative / treaty commitments and moral/religious factors. Part 1 of the module concludes with a consideration of social justice in contemporary societies, using a student-led collaborative case study approach. Part 2 of the module turns its attention to the more specific role of public administration in relation to the design/pursuit of social justice objectives. It explores key issues such as the politics-administration dichotomy, bureaucratic neutrality and values and ethics in public administration. The module also looks at the place of social justice objectives within changing public administration paradigms, including new public management and investigates some empirical examples of how public administration in different countries engages with a social justice agenda.

PO4027 - INTERNATIONAL ORGANISATIONS AND GLOBAL GOVERNANCE

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: To examine the range of international organizations that influence global politics, and to assess their role in running the global political economy.

Syllabus: The origins of international organizations, and their place in liberal internationalist thought; the successes and failures of the League of Nations system; the United Nations system and its internal processes; regional organizations; non-governmental organizations and global governance; international organizations and the search for political and military security; functional-technical cooperation at the regional and global level; global governance and the post-Cold War global political economy.

Prerequisites: PO4004

PO4067 - STUDIES IN POLITICAL THOUGHT

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: To build on the knowledge gained during earlier modules, especially PO4022 Modern European Political Thought, by exploring the writings of a few key political thinkers in more depth. This module will be an option in the fourth year and is intended for those interested in exploring political theory themes in more depth. The class will follow a seminar format.

Syllabus: The relationship between political action and political philosophy, with reference to questions of freedom and virtue, explored through the thought of Plato, Machiavelli, and Foucault; the political thought of Plato as a foundation for Western philosophy; the politics of Machiavelli and his influence on the development of humanism and republicanism; Michel Foucault and the relationship between truth and power.

Prerequisites: PO4022

PO4117 - POLICY-MAKING IN THE EUROPEAN UNION

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: The module is being created as an addition to the elective choice for students in semesters 7 and 8 on BA Politics and International Relations and on AHSS programs where Politics is offered as an option. It better reflects the subject expertise of current teaching staff in this area than existing modules.

Syllabus: This module takes a detailed look at the policy-making process of the EU. Few EU policies directly redistribute money, yet even if they sometimes seem to focus on rather arcane technical issues, they often have profound consequences for the legal rights and the welfare of individual citizens, the competitiveness of companies or entire industries, and the social, economic, and democratic development of Europe as a whole. If we want to evaluate the functioning of the EU as a democratic political system, we need to know who is involved in the formulation and implementation of those policies, to what extent these actors and the structural characteristics of the process influence the shape and content of those policies, and why different actors and structural characteristics vary in their influence on policy outcomes. These are the types of questions discussed in this module.

Module outline:

- Introduction and historical background
-The institutional framework
-Policies and policymaking
-Theories of European integration and policymaking
-Agenda-setting
-EP decision making
-Council decision making
-Bicameral bargaining
-Transposition and implementation
-Enforcement and judicial review - Evaluation

PO4032 - RUSSIAN POLITICS

ECTS Credits: 6 (Year 4 Module)

Politics and Public Admin

Rationale and Purpose of the Module: The purpose of this module is to help students explore issues in Russian political development over the last century according to their interests. Students have free choice of which topics they study so that the learning outcomes of the module will be individualized. In addition to the knowledge gained by students about the USSR and Russia, this module will help students to develop their analytical and research skills. All students, however, will have to

search out information on contemporary Russia in their own time and will learn how to locate information in the library and on the WWW, will learn how to judge the merits of different information sources, will learn how to construct arguments from primary materials that they have and how to relate such materials to existing academic literatures. They will also have to learn how to interpret academic literature in changing circumstances, to relate it to a developing polity and judge it against change.

Syllabus: This module is a reading course, students consult over and decide in consultation with the lecturer over the topics in Soviet and Russian politics that they study and write on. These topics include may include, but are not limited to: Leninism and Bolshevism as political theory The 1917 revolution The relationship of Leninism and Stalinism The development of the Stalinist system The great terror Khrushchev and destalinisation The institutions of the USSR: the party-state system Theories of the development of the Soviet system The political economy of the USSR Soviet foreign policy The nature of the USSR (various approaches can be studied including totalitarianism, Marxist approaches etc) The Gorbachev reforms Why did the USSR collapse? Soviet legacies and the post-Soviet policy agenda The theory of economic reform and post-Soviet politics The post-Soviet struggle for power, 1992-1993 The presidency under Yeltsin Yeltsin, oligarchy and the corruption of the state The Putin programme: reform or retrenchment? The political economy of the new Russia Russia and the resource curse The new Russian political system: Elections The new Russian political system: political parties The new Russian political system: parliament The new Russian political system: the development and dysfunctions of federalism Russian foreign policy Russia in comparative perspective State and democracy in the new Russia

Politics and Public Admin

Year 5 Modules

PO5004 - GRADUATE SEMINAR IN DEVELOPMENT

ECTS Credits: 9 (Masters Module)

Politics and Public Admin

Rationale and Purpose of the Module: This module will introduce students to the concept of development and ideas about how it should be pursued. It will examine the ideas and imperatives shaping development policy, such as market led, sustainable, rights based and gender-equitable approaches and will explore the contradictions or intersections between these approaches. It will then set out key development challenges, including climate change, alternatives to development and the problem of conflict. It will discuss the particular challenges presented by 'fragile states' and will explore the relationships between development policy, conflict and other development challenges in depth, analysing and comparing cases.

Syllabus: Introduction: What is development? exploring concepts and theories Part 1: Contemporary approaches to development: Good governance; sustainable development; rights-based development, gender and development, human security Part 2: Contemporary challenges to development: Climate change and environmental threats, The 'conflict trap'? exploring the linkages between development and violence; social movements, alternatives and resistance to globalisation; Part 3: Development in 'fragile states': case-studies.

PO5015 - GRADUATE SEMINAR IN CONTEMPORARY POLITICAL THEORY

ECTS Credits: 9 (Masters Module)

Politics and Public Admin

Rationale and Purpose of the Module: This module will introduce students to the work of leading contemporary political theorists and to some prominent debates within recent political theory. The module blends conceptual analysis, normative reasoning and the close reading of complex philosophical arguments in order to enable to students to develop their analytical skills in reading, understanding, interpretation and argument.

Syllabus: Political Concepts (Political Authority and Obligation; Liberty; Equality; Rights) - Theories of Justice (Liberal Egalitarianism; Libertarianism; Socialism; Communitarianism) - Democratic Theory (Representation; Deliberation; Legitimacy)

PO5016 - GRADUATE SEMINAR IN INTERNATIONAL RELATIONS

ECTS Credits: 9 (Masters Module)

Politics and Public Admin

Rationale and Purpose of the Module: The main aim of this module is to examine some of the more significant theories, issues, and debates in the study of International Relations, such as those pertaining to the schools of thought known as realism, liberalism, feminism, and constructivism. This will be achieved through a close reading of a number of international relations texts, each of which cover theories, issues, and debates that are core to our understanding of international affairs.

Syllabus: The assessment is set up so that students can begin to specialise in certain aspects of IR, while keeping an eye on the wider history and theoretical context of the discipline. The reading lists have been designed to familiarise students with the various approaches that are used to explain IR, and the seminar discussions will apply these theories to events in the international sphere. As a result it is important for each student to read the required readings before class. By the end of the module students will have developed a strong grasp of the nature of IR theories, and be able to use their understanding of these theories to construct complex intellectual arguments. The module content will be particularly valuable to students when they come to construct the theoretical framework for their dissertation.

PO5017 - GRADUATE SEMINAR IN INSTITUTIONS AND POLICIES OF THE EUROPEAN UNION

ECTS Credits: 9 (Masters Module)

Politics and Public Admin

Rationale and Purpose of the Module: The aim of this module is to develop students' understanding of how the European Union formulates and adopts policies. Special attention is given to the roles and organisational structures of the different institutions involved in the EU policy-making process. The module presents theories of integration and policy-making, the internal organisation, functions, and powers of the main institutions of the EU, and the inter-institutional decision-making process through which those institutions interact to shape the content of policies.

Syllabus: The module introduces students to the institutions and policies of the European Union. The first part of the module is devoted to the description and explanation of the internal workings of the European Commission, the European Parliament, and the Council of the European Union. It will also cover the interaction of those institutions in the EU's legislative decision-making process. The second part of the module focuses on how policy decisions are made in different policy sectors, highlighting distinctions in institutional structures and actor configurations. Theories aimed at explaining important sector-specific decisions and developments are also discussed. Examples will be drawn from a variety of policy areas, such as the common agricultural policy, justice and home affairs, the internal market, environmental policy, and economic and monetary policy.

PA6011 - PUBLIC ADMINISTRATION THEORY AND PRACTICE

ECTS Credits: 9 (Masters Module)

Politics and Public Admin

Rationale and Purpose of the Module: The module is being created for inclusion in a revised MPA programme (full time, part time and Graduate Diploma). The module will serve as an advanced introduction to Public Administration. It will identify key ideas and theoretical perspectives in its academic study and relate them to debates and issues in the daily work of public administrators, often working within complex networks with other public, non-profit and private sector organisations.

Syllabus: Introduction: public administration, public management, and governance The role of Government - context, instruments, size Ideas & practice - bureaucracy and management; politics and administration Policy making process Public management reform Street level bureaucrats & service delivery Digital governance Public leadership Accountability Regulation, contracting and public ownership Strategic management in the public sector

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School of Modern Languages & Applied Linguistics

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

School of Modern Languages and Applied Linguistics Year 1 Modules

BR4022 - BROADENING MODULE: "THE EUROPEAN UNION: BROADENING THE PERSPECTIVE"

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The module will offer students who would otherwise not engage in European Studies an opportunity to engage in European Union Studies. While imparting information to key aspects of the history, institutions and politics of the European Union will be most prominent in the first half of the module, the second half aims to actively engage students in discussions about topical issues, such as migration, climate change and Brexit, but also, and perhaps more importantly, in reflections about the future of the European Union, which the students themselves will help to shape in their later careers. The module is interdisciplinary in nature and includes and integrate the areas of politics, cultural studies, and language studies. It aims to counteract the perception of the European Union as a top-down political enterprise by encouraging students to see it as one dependent on the active engagement of citizens. The module will also address the role of ERASMUS, in which many students will participate, in shaping a sense of EU citizenship. By reserving one-quarter of the places on this module to ERASMUS students from as wide a range of member states as possible the module will bring the multilingual and multicultural European experience into the classroom and make the different national perspectives an integral part of the debate. It will consist of an academic part and - as part of the UL Engage initiative - an off-campus element in which students engage both Limerick schools and the public in Limerick City in discussions about what it means to be an EU citizen today. A European element will increase the career prospects of graduates from any discipline in a future Europe, in which after Brexit, Ireland is likely to be even more closely interlinked with other member states.

Syllabus: Part I (weeks 1-6)

Week 1 Introduction; History of the European Idea; What Makes an EU citizen? (Fischer)

Week 2 History of the EU; Institutions and their Functions: Democracy in the EU (Costello)

Week 3 The Four Freedoms (Costello)

Week 4 Social Europe (Moxon-Browne)

Week 5 Ireland in the European Union (Moxon-Browne)

Week 6 EU Languages and Language Policy (Atkinson)

Part II (Weeks 7-9) (topics may change depending on political developments)

Weeks 7/8 Year 1: Brexit, Migration; Year 2: The Euro, "Austerity"/"Fiscal Discipline"; Year 3: External Relations, Climate Change (Scully)

Week 9 Student presentations: mixed groups of 6-7 students (Irish/ERASMUS) will present summaries of debates on the above issues in the media of selected member states in comparison to the representation of these debates in the Anglophone media of Britain and Ireland. (Scully)

Part III

Week 10 The ERASMUS Experience: Auberge Espagnol (Fischer)

Week 11 Preparation for Part IV Community Engagement (Schools: Mannix McNamara / City: Scully)

Week 12 The Future of the European Union (Fischer)

Part IV: One full day in week 12 (Friday/Saturday) will be dedicated to Community Engagement: four groups will engage with pupils in one secondary and one primary school and two with passers-by in selected locations in Limerick city Centre (Schools: Mannix McNamara / City: Scully).

CU4121 - INTRODUCTION TO NEW MEDIA AND CULTURAL STUDIES

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied

Linguistics

Rationale and Purpose of the Module: To introduce students to the fields of cultural studies and new media and to the basic concepts underlying their study of these disciplines over the course of their programme. To give students the theoretical tools to analyse cultural processes and to investigate new media as cultural institutions, particularly in comparative contexts.
To raise students' intercultural awareness as part of a process of preparing for the Erasmus/study abroad semester. To introduce students to the concept of career planning, particularly with the objective of preparing them for cooperative education as an integral part of their course.

Syllabus: The notion of culture: defining and describing the notion of culture and cultures; comparing different definitions and traditions of the culture in a range of contexts; cultural anthropology; linguistic dimensions of culture; cultural policy and cultural imperialism; language and cultural awareness. Media and culture: identifying and describing cultural dimensions of media processes; the cultural specificity of media in different linguistic and cultural contexts; cultural dimensions of new media processes. Analysing cultural processes: theories and methodologies of cultural analysis. Career planning for students: skills awareness; career awareness; preparation for the off-campus year.

GE4621 - GERMAN LITERATURE AND CULTURE 1: INTRODUCTION TO GERMAN LITERATURE
ECTS Credits: 6 (Year 1 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give an overview over the different ways of approaching a literary text, the different genres and text types, defining their characteristics. To introduce students to the major periods and movements in the history of German literature focusing on its interrelatedness with other European literature in conjunction with the general lecture (to be continued in the Spring Semester). To develop students' analytic and interpretative skills.

Syllabus: Lecture: What is literature? How do we interpret a literary text? A brief history of German literature. Tutorials: a) analysing literary examples from different periods; b) detailed analysis of a longer text in the German language; introduction to the interpretation of literary texts in a foreign language.

ES4001 - EUROPEAN STUDIES: A GLOBAL PERSPECTIVE
ECTS Credits: 6 (Year 1 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims to provide an induction into third-level study for European Studies students and to mediate to new third-level learners the nature of European Studies as a combination of different academic disciplines and interdisciplinary possibilities. The module seeks to develop critical analytical skills, oral and written presentational skills and to provide new students with a critical overview of the contemporary state of their field of study. It will also have the goal of enhancing group experience and dynamics within the course with a view to maximizing the educational benefits students derive from their disciplinary and
linguistic studies. It will foster an awareness of the importance of autonomous learning and participatory research in the undergraduate educational experience. Finally, it will promote awareness among students of the fact that they will be working in an intercultural field and of the consequent importance of developing intercultural competencies.

Syllabus: This introductory module is organized around a selected set of themes in the interdisciplinary field of European Studies.
Each theme set is formulated as a question put to participants, for unpacking, development,

autonomous research, and intensive, teacher-facilitated discussion. The central focus of the module will be on fostering in new entrants the skills necessary for full engagement with the European Studies degree. Topics for study may include the following: Geographical and territorial definitions of Europe. Linguistic issues in Europe. Unity and diversity of European culture. The 'cultural industry' in Europe. 'European' values, democracy, and diversity as case studies. The question of a 'European' economic model. Citizenship in European and global contexts. The role(s) of Europe within globalization and a wider 'world' system. Colonialism, its practices, and its legacies. Ireland in a European and a global context.

FR4141 - FRENCH LANGUAGE AND SOCIETY 1: INTRO FRENCH STUDIES 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). (i) To present key issues in contemporary French society.

(ii) to enable students to develop receptive and active language skills; (iii) to review French grammar; (iv) to examine developments in the French language.

(v) to introduce students to the study of French literature.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). The module provides students with the space to develop and practice their French language skills and increase their level of cultural awareness. Listening comprehension is practised via the use of podcasts, videos, and online activities; - The study of grammar is supported by tutorials, video resources and online homework tasks; - Opportunities are provided in tutorials to develop oral competencies in pronunciation, conversation, and debate classes as well as the study of cultural and literary texts and films.

FR4241 - FRENCH LANGUAGE, CULTURE AND SOCIETY 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). (i) To provide students with an introduction to major aspects of contemporary French society and culture; (ii) to familiarize students to issues related to the evolution of the French language; (iii) to introduce students to the study of French literature; (iv) to give a solid grounding to a few points of French Grammar. (v) to enable students to develop practical language skills (oral and written).

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Students are introduced in lectures to the study of social, historical, linguistic, and literary aspects of French society and culture. The themes explored in this semester are (i) 19th century France (ii) le roman réaliste (iii) current affairs in France today. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written material from diverse media. An overall review of French grammar is carried out with special emphasis on French grammatical metalanguage.

FR4921 - FRENCH FOR BUSINESS 1A

ECTS Credits: 6 (Year 1 Module)

Restrictions: Leaving Cert French Level/Equivalent required

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). (i) To introduce students to Business French relevant to

their future professional needs, (ii) to provide students with an understanding of key aspects of contemporary French society, (iii) to enable students to develop practical skills (receptive and active), (iv) to consolidate students' knowledge of French vocabulary and grammar.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). Students are introduced to the study of social, historical, linguistic, and literary aspects of French culture and society. Themes studied in this semester are (i) the Republican heritage (ii) the modern short story and (iii) the history of the French language. Oral and aural skills in French are improved through the discussion of a broad selection of contemporary oral and written texts, from diverse media. With the use of authentic material and with a variety of linguistic activities simulating business environment students are asked to deal competently with tasks encountered in specific situations; the areas of focus include applying for a job, job interview, working in a company. Students are also asked to do oral presentations on contemporary French society and culture. Students' grammatical competence acquired in secondary school is further developed.

FR4621 - FRENCH LITERATURE AND CULTURE 1: 20TH CENTURY LITERATURE

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To introduce students to the study of twentieth-century literature in French from a variety of critical perspectives. To give students the opportunity to examine authors in greater detail. To develop students' skills in communicating ideas in oral and written French.

Syllabus: Several literary texts of an appropriate linguistic level and representativity in terms of period and genre will be studied in this module.

GE4141 - GERMAN LANGUAGE AND SOCIETY 1: INTRO GERMAN STUD 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). To introduce students to the academic study of the German language, its historical, social, and structural dimensions as well as into language learning strategies and resources. To provide students with an introduction to the German-speaking countries as physical, cultural, and political entities with a focus on the first half of the twentieth century. To introduce students to the analysis of literary texts in German. To consolidate linguistic knowledge (written and oral) gained at school.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century. Tutorials: a) reading of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; b) contrastive grammar work: grammatical categories and terminology, English/German translation exercises, grammar in use/communicative grammar. Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

GE4211 - GERMAN FOR BEGINNERS 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A1 on the Common European Framework of Reference for Languages (CEFR). To provide students with an introduction to the

German-speaking countries as physical, cultural, and political entities. To give an overview of the major social and cultural developments in the German-speaking countries of Europe in the 19th and early 20th century. To introduce students to the academic study of the German language, its historical, social, and structural dimensions. To provide communicative skills (listening, speaking, reading, writing) at a basic level in German through the introduction and practice of simple grammatical structures, functions, and vocabulary. To introduce students to autonomous language- learning methods.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR). Lecture: The German language, its history and relationship with other languages; political geography of the German speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century. Tutorials: Working with the set textbook, back-up audio-visual and online materials, students are introduced to the concepts of gender, number, and case and to the basic structures of the German language. Students are also made aware of approaches to language learning, including developments of autonomous learning skills, exploitation of reference material and dictionaries, etc. Language Laboratory: Consolidation is provided through ICT and language laboratory work, and students are expected to make full use of all laboratory facilities in their private language study.

GE4241 - GERMAN LANGUAGE, CULTURE AND SOCIETY 1

ECTS Credits: 6 (Year 1 Module)

Restrictions: Leaving Cert German Level/Equivalent/CEFR B1.1 required

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). To provide students with an introduction to German-speaking countries as physical, cultural, and political entities; to develop communicative skills by revising and consolidating basic structures and vocabulary; to introduce autonomous language learning methods. Emphasis in modules GE4241 and GE4242 is placed on establishing a solid foundation in the language; by the end of Year 1, students are expected to use all basic grammatical structures with a high degree of fluency and correctness.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century. Tutorial work: Grammar/translation: introduction to basic grammatical categories and terminology; consolidation of existing grammatical knowledge and expansion into more complex structures; contrastive work by means of English/German translation exercises; Text analysis & production: principles of textual analysis and text discussion (literary and non-literary); grammar in use/communicative grammar. Laboratory: 1 hour per week in the CALL/language laboratory will support grammar and oral work.

GE4921 - GERMAN FOR BUSINESS 1A

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). To consolidate existing language skills and to improve general competency in German. To provide an insight into socio-economic and political structures in Germany, Austria, and Switzerland and to familiarize students with culture and history of the German-speaking countries. To introduce students to learning strategies and multimedia facilities in language learning.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: The German language, its history and relationship with other languages; political geography of the German-speaking countries; sociocultural and historical background to the German-speaking countries of Europe in the 19th and early 20th century.
Tutorials: a) reading of literary texts to provide further access to the period while at the same time introducing reading techniques, principles of textual analysis and text discussion in oral and written form; b) introduction to business in German and project work in Business German Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

JA4001 - INTRODUCTION TO JAPANESE CULTURE AND SOCIETY
ECTS Credits: 6 (Year 1 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Japanese has a complex and multifaceted culture that influences how the Japanese think, speak, interact and live. This module provides a general but solid foundation and understanding of Japanese culture and society, both from a historical and contemporary perspective. As an introductory module, we pay special attention to a range of topics that include, but are not limited to, language, education, housing and family, work culture and business etiquette, food culture, traditions, cultural values, popular culture, identity and diversity, politics, religious practices, sports and current social issues. This module fosters intercultural awareness, critical thinking and presentation skills. This module is taught in English, and you don't need to be enrolled in a language course to take it.

Syllabus: This module offers an introduction to cultural aspects that inform Japanese society today. It focuses mainly on showcasing the multifaceted nature of Japanese culture by fostering intercultural awareness and critical understanding of a variety of up-to-date information on arts, literature, sports, education, family and food culture, diversity, and more. This is to facilitate more opportunities for (inter)cultural understanding, exchange and learning.

JA4211 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 1
ECTS Credits: 6 (Year 1 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A1 on the Common European Framework of Reference for Languages (CEFR). To provide a firm grounding in understanding, speaking, reading, and writing basic Japanese, and aspects of Japanese culture and society, as well as to begin to develop life-long language learning strategies with learners.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR). Listening practice leading to the recognition of numbers, times, days, dates, locations, greetings, and questions. Conversation practice based on grammar structures and vocabulary necessary to use greetings, introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes. Reading practice progressing from the understanding of notices and posters to descriptions of people's everyday lives. Writing practice introducing the hiragana and katakana writing systems and 80 kanji progressing to being able to write passages involving self-introduction, daily routines, hobbies, and shopping. Reading and discussion in English about Japanese customs, culture, and society.

JA4911 - JAPANESE FOR BUSINESS 1
ECTS Credits: 6 (Year 1 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A1 on the Common European

Framework of Reference for Languages (CEFR). To provide a firm grounding in understanding, speaking, reading, and writing basic Japanese, and aspects of Japanese culture and society, as well as to begin to develop life-long language learning strategies with learners.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR). Listening practice leading to the recognition of numbers, times, days, dates, locations, greetings, and questions. Conversation practice based on grammar structures and vocabulary necessary to use greetings, introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes. Reading practice progressing from the understanding of notices and posters to descriptions of people's everyday lives. Writing practice introducing the hiragana and katakana writing systems and 80 kanji progressing to being able to write passages involving self-introduction, daily routines, hobbies, and shopping. Reading and discussion in English about Japanese customs, culture, and society.

LI4001 - PEER TUTORING FOR LANGUAGES

ECTS Credits: 3 (Year 1/2/3/4 Module)

Graded on a Pass/Fail basis

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module:

This module aims to provide students who are native speakers of a language other than English which is taught in the School of Languages, Literature, Culture and Communication (hereafter referred to as LOTE students) with the appropriate training, guidance, and support to effectively facilitate optional peer-led discussion groups or one-to-one sessions in the target language for UL language learners of French, German, Irish, Japanese, and Spanish. It also aims to provide the LOTE students with transferable knowledge and skills which will be of use to them in their future careers and in their own language learning. This module mainstreams a project which has been very successfully running with AHSS Faculty Development Teaching Fund since September 2012. In AY 2012-13, 19 LOTE students were trained as peer tutors and 133 hours of additional language practice were provided. Substantially more hours are being provided in AY 2013-14 (32 peer tutors have enrolled in the Autumn Semester). Practicing the language is paramount in achieving fluency and accuracy, and yet language studies programs within Higher Education are understandably limited in the amount of focused language practice they can offer. This module aims, therefore, also to address this issue by providing multilingual peer tutoring in a systematic manner, parallel to existing language studies modules. Consequently, the module equally provides additional benefit in supporting all UL language students participating in the discussion groups and/or one-to-one sessions.

Syllabus: This module will prepare LOTE students to facilitate peer-led discussion groups and one-to-one sessions in their native language. It will particularly focus on the following aspects: - The role of a facilitator of a discussion group or one-to-one session - The difference between teaching a language class and facilitating a discussion group or one-to-one session - The skills and techniques necessary to break the ice within a group or in a one-to-one session - The feedback which it is appropriate to give to attendees (grammar, vocabulary, pronunciation, register, etc.) - The role of attendees' language-learning background - Relevant topics for the discussion- group sessions and one-to-one sessions - Communication issues which may arise (e.g., cultural differences) - Key communication strategies necessary to encourage participation in a discussion group - The main linguistic pitfalls for language learners - The nature and role of a reflective portfolio.

SP4001 - WHO ARE THE SPANIARDS? INTRODUCTION TO SPANISH CULTURE

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The development of Spanish culture has been marked by different attempts at constructing a national identity in different forms, from the attempts at uniformity promoted by the Spanish Empire ûthen re-appropriated by the dictatorship of Francisco Franco- to the re-construction of an identity directed towards the integration of Spain in Europe and, more recently, the attempts to construct an identity which integrates both past and present. Accordingly, the module will pay special attention to the cultural impact of the end of the Spanish Empire, the Spanish Civil War, and the Transition to Democracy. After completion of this module, students will have achieved a general but solid knowledge of the main socio-political processes in Spanish history and their effects on and interaction with literary and film production, as well as other forms of culture.

Syllabus: This module offers an introduction to the most important events and movements in Spanish culture. It focuses mainly on the cultural impact of the Spanish Empire, the Spanish Civil War, the dictatorship of Francisco Franco, and the Transition to Democracy. Using literature, music, film and other forms of culture, the module will serve as a platform for the exploration of up- to-date socio-political issues in Spain and their effect on cultural production.

SP4131 - SPANISH FOR BEGINNERS 1 (EUROPEAN STUDIES)

ECTS Credits: 6 (Year 1 Module)

*** SP4231 and SP4131 modules are both the same and cannot be taken together***

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A1 on the Common European Framework of Reference for Languages (CEFR). The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America. The course is designed to: Enable the student to understand and use basic structures of Spanish grammar. Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to and communicate with native speakers of Spanish. To foster autonomous language learning skills. To introduce the student to Spanish and Latin American cultures. To develop listening and speaking skills in Spanish. To equip the student with basic writing skills.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR). Lecture: introduction to Spanish and Latin American history, politics, and cultures. These include: the Spanish language and the languages of Spain, socio-cultural and historical background to Spain and Latin America from the formation of the Spanish state and the indigenous cultures of Latin America to the mid-20th century. Tutorials and lab: working with set textbook, back-up audio-visual an online material, students are introduced to the concepts of gender, number, verb systems and to the basic structures of the Spanish language.

SP4231 and SP4131 modules are both the same and cannot be taken together

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SP4141 - SPANISH LANGUAGE AND SOCIETY 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). The course is designed to: Revise and broaden the students' knowledge of the structures of Spanish grammar. Expand the students range of Spanish vocabulary. Improve pronunciation and patterns of intonation in Spanish. Further develop the student's language skills by exposing them to different situation and registers, both formal and informal. Facilitate the students understanding of various cultural aspects within the Spanish-speaking world. Foster autonomous language learning.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).

The course is designed to: Revise and broaden the students' knowledge of the structures of Spanish grammar. Expand the students range of Spanish vocabulary. Improve pronunciation and patterns of intonation in Spanish. Further develop the student's language skills by exposing them to different situation and registers, both formal and informal.

Facilitate the students understanding of various cultural aspects within the Spanish-speaking world. Foster autonomous language learning.

SP4161 - SPANISH FOR BUSINESS 1 ECTS

Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module:

This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). (i) To introduce students to Business Spanish relevant to their future professional needs, (ii) to provide students with an understanding of key aspects of contemporary Spanish society, (iii) to enable students to develop practical skills (receptive and active), (iv) to consolidate students' knowledge of Spanish vocabulary and grammar.

Syllabus: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). The main areas of grammar covered are the passive voice; imperative forms which use the subjunctive; the conditional tense; second and third conditionals; present subjunctive with temporal adverbs and to express future time.; The main areas of phonology covered are: reinforcement of the vowel and consonant systems and basic word stress patterns. The above is complemented by communicative, lexical, and oral and written skills syllabi included in a textbook which will be chosen according to the range of availability at the relevant point in time. An example of the latter would be units 1-3 of the textbook Expertos. These include areas such as: writing CVs and job applications and participating in interviews; the language of business meetings and negotiations; cross-cultural politeness; expressing opinions, conditions, and agreement; the lexis of expatriate life; conducting interviews.

SP4231 - SPANISH LANGUAGE, CULTURE AND SOCIETY 1 (BEGINNERS)

ECTS Credits: 6 (Year 1 Module)

*** SP4231 and SP4131 modules are both the same and cannot be taken together***

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A1 on the Common European Framework of Reference for Languages (CEFR). The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America. The course is designed to: Enable the student to understand and use basic structures of Spanish grammar. Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to and communicate with native speakers of Spanish. To foster autonomous language learning skills. To introduce the student to Spanish and Latin American cultures.

To develop listening and speaking skills in Spanish. To equip the student with basic writing skills.

Syllabus: This syllabus is set at A1 on the Common European Framework of Reference for Languages (CEFR).

Lecture: introduction to Spanish and Latin American history, politics, and cultures. These include: the Spanish language and the languages of Spain, socio-cultural and historical background to Spain and Latin America from the formation of the Spanish state and the indigenous cultures of Latin America to the mid-20th century. Tutorials and lab: working with set textbook, back-up audio-visual an online material, students are introduced to the concepts of gender,

number, verb systems and to the basic structures of the Spanish language.

SP4231 and SP4131 modules are both the same and cannot be taken together

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SP4241 - SPANISH LANGUAGE, CULTURAL AND SOCIETY 1

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). The course is designed to: Revise and broaden the students' knowledge of the structures of Spanish grammar. Expand the students range of Spanish vocabulary. Improve pronunciation and patterns of intonation in Spanish. Further develop the student's language skills by exposing them to different situation and registers, both formal and informal. Facilitate the students understanding of various cultural aspects within the Spanish- speaking world. Foster autonomous language learning.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). The advanced course consists of four hours of Spanish per week: Two language tutorials (grammar, vocabulary, communication skills, writing and reading skills). One laboratory/oral class (oral communication skills). One General Lecture.

TE4011 - ENGLISH AS A FOREIGN LANGUAGE 1 (INTERMEDIATE)

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). To provide language support to students on the Erasmus exchange programs to enable them to benefit more fully from their Erasmus experience at a social, cultural, and academic level. To provide integrated tuition and practice in the four language skills of listening, speaking, reading, and writing.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR).

Students work from a set textbook, back-up audio visual and on-line material. Practice is given in the four language skills, language awareness-raising and with special emphasis on pronunciation at this level. The following grammatical areas are covered: verb tenses e.g., present simple and continuous, past simple and continuous, future forms, present perfect simple and continuous; modality and conditionality; modal verbs expressing obligation, deduction, possibility and ability, first conditional lexis e.g., frequent collocations, common expressions, conversational responses, and idioms, qualifying using adverbs and adjectives, comparatives and superlatives, discourse markers (oral and written) e.g., connectives, sequencing, signposting.

TE4021 - ENGLISH AS A FOREIGN LANGUAGE 1 (UPPER INTERMEDIATE)

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). To provide language support to students on the Erasmus exchange programs to enable them to benefit more fully from their Erasmus experience at a social, cultural, and academic level to provide tuition and practice in the four language skills of listening, speaking, reading, and writing.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR).

Students work from a set textbook, back-up audio visual and on-line material. Integrated tuition and practice are given in the four language skills. The following grammatical areas are covered: Phrasal

verb structure, position of adverbs, future time forms, conditionals, narrative tenses, modal verbs of deduction lexis e.g., frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g., connectives, sequencing, signposting.

TE4031 - ENGLISH AS A FOREIGN LANGUAGE 1 (ADVANCED)

ECTS Credits: 6 (Year 1 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at C1 on the Common European Framework of Reference for Languages (CEFR). To provide language support to students on the Erasmus exchange programs to enable them to benefit more fully from their Erasmus experience at a social, cultural, and academic level to provide tuition and practice in the four language skills of listening, speaking, reading, and writing.

Syllabus: This syllabus is set at C1 on the Common European Framework of Reference for Languages (CEFR).

Students work from a set textbook, backup audiovisual and online material. Integrated tuition and practice are given in the four language skills. The following areas are covered: grammar; modals and meaning, the perfect infinitive, mixed conditionals, tenses in accounts and narratives, all aspects of reported speech Lexis: word-building, compound adjectives, synonyms, confusable words, metaphorical language, intensifying adverbs, discourse markers, phrasal verbs, collocations, British v American, English Recognition and use of the IPA future forms, wishes, and regrets, defining and non-defining relative clauses, noun clauses, adverb clauses, perfective v progressive aspect, gerunds, infinitives

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School of Modern Languages and Applied Linguistics Year 2 Modules

BR4012 - BROADENING: COMMUNICATION ACROSS CULTURES

ECTS Credits: 6 (Year 2 Module)

Restrictions: Additional cost associated with this module choice

This module has embedded a Virtual Exchange

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning about language and intercultural communication. In our increasingly multicultural and multilingual society, communities and organizations are faced with several difficult challenges as they strive to provide a respectful, safe and harmonious environment for all. It is crucial that students have opportunities to understand and appreciate their own culture and make connections to appreciate the cultures and experiences of others. To this end, the module aims at developing students' intercultural communication competence and is aimed at non-traditional language students. The module will bring the concept of intercultural learning to life in a way that is engaging and allows students to critically evaluate the importance of culture and language in intercultural communication. The first part of the course explores views of identity, culture, and intercultural communication including the role of language. Students will look at representations of 'us' and 'them ', drawn from a range of genres including: the media, websites, embassy, and business publications as well as representations in art and film. Students will reflect on their own cultural identities and how these might have informed their interpretations of the "other". In the second part of the course students will carry out a collaborative project of intercultural learning. They will be paired with native speakers from other cultures and be required to carry out tasks aiming at raising intercultural learning.

Syllabus: This module aims at developing students' intercultural communication competence. The module will bring the concept of intercultural learning to life in a way that is engaging and allows students to critically evaluate the importance of language in intercultural communication. Students will attend an individual advisory session with a language tutor where they will reflect on their current language level and intercultural awareness; this will allow students to identify learning goals and create a programme of learning including telecollaborative tasks to achieve these goals. Students will take responsibility for the organization of their own learning, establish, and maintain contact with their partners and seek and offer information and opinions to enable development of intercultural communicative competence. Students will demonstrate in-depth reflection on their learning process through the keeping of a learner diary, in which they will record progress made, plan their next steps, and reflect on their development during the semester.

BR4921 - BROADENING: BEGINNERS GERMAN
ECTS Credits: 6 (Year 2 Module)
School of Modern Languages and Applied Linguistics
Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning German. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in German and is targeted at those who have not studied German previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing), It will also aim at developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in the German-speaking world and deepen their knowledge and understanding of German society and culture.

Syllabus: This module aims to introduce students to German and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in German to: manage to pronounce very short, isolated mainly ready-made expressions; show a limited control of a few simple grammatical structures; use a very basic repertoire of words related to personal details; use a limited range of vocabulary to talk about particular concrete situations; use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies); write simple isolated phrases and sentences on everyday topics.

BR4931 - BROADENING: BEGINNERS SPANISH
ECTS Credits: 6 (Year 2 Module)
School of Modern Languages and Applied Linguistics
Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning Spanish. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in Spanish and is targeted at those who have not studied Spanish previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing). The module also aims to develop confidence and a degree of accuracy when using the language in a limited range of situations. The module will stimulate students' interest in Spain and Latin

America and deepen their knowledge and understanding of Spanish and Latin American society and culture

Syllabus: This module aims to introduce students to Spanish and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficency in Spanish to: manage to pronounce very short, isolated mainly ready-made expressions; show a limited control of a few simple grammatical structures; use a very basic repertoire of words related to personal details; use a limited range of vocabulary to talk about particular concrete situations; use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies); write simple isolated phrases and sentences on everyday topics.

BR4901 - BROADENING: BEGINNERS JAPANESE

ECTS Credits: 6 (Year 2 Modules)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning Japanese. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in Japanese and is targeted at those who have not studied Japanese previously. The emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading, and writing) while developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in Japan and deepen their knowledge and understanding of Japanese society and culture. Syllabus: This module aims to introduce students to Japanese and gradually develop their ability to function at beginners' level. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in Japanese to: recognize numbers, times, days, dates, where things are, greetings and questions; speak using greetings, expressions of time, price, number, place, talk about themselves, their likes, dislikes, pastimes and schedules, and ask basic questions; read words written in the hiragana, katakana and kanji writing systems, grasp information from signs, posters, notices, self-introductions, and descriptions; write, using the writing systems studied, short passages about themselves, their lives and their pastime.

BR4911 - BROADENING: BEGINNERS FRENCH

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning French. In our increasingly multicultural and multilingual society, it is crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in French and is targeted at those who have not studied French previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on achieving a basic level of communication in all four skills (listening, speaking, reading and writing). It will also aim at developing confidence and a degree of accuracy when using the language in a limited range of situations. The module also aims to stimulate students' interest in the French-speaking world and deepen their knowledge and understanding of French society and culture.

Syllabus: This module aims to introduce students to French and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in French to: manage to pronounce very short, isolated mainly ready-made expressions; show a limited control of a few simple grammatical structures; use a very basic repertoire of words related to personal details; use a limited range of vocabulary to talk about particular concrete situations; use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies); write simple isolated phrases and sentences on everyday topics.

FR4143 - FRENCH LANGUAGE AND SOCIETY 3 EDUCATION AND WORK E

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). (i) To increase student's awareness of key issues in French business; (ii) to develop students' linguistic knowledge of business communication in French; (iii) to build on student's practical language skills acquired in first year; (iv) to further students understanding of advanced French syntax; (v) to extend students reading and analytical skills in the study of French literature and film.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR). Lectures introduce students to the study of social, historical, linguistic, and literary aspects of contemporary France. Themes presented this semester are: (i) the world of work and business in France; (ii) representations of French modernity in film and literature; (iii) French discourse genres. Tutorials explore these subjects and students reading and writing skills are improved through regular exercises. Oral and aural skills in French are stressed and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. A review of French grammar is carried out at a more advanced level.

Prerequisites: FR4142

FR4243 - FRENCH LANGUAGE CULTURE AND SOCIETY 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). (i) To deepen student's awareness of major developments and issues in business in contemporary France; (ii) to provide students with the language skills needed to communicate and work in a French business context; (iii) to extend students reading and analytical skills in the study of French literature; (iv) to further students understanding of advanced French syntax; (iv) to build on student's practical language skills acquired in the first year.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR). Students are introduced in lectures to the study of social, historical, linguistic, and literary aspects of French society and culture. Themes explored this semester are (i) the contemporary French world of work and business (ii) representations of French modernity in film and literature (iii) French discourse genres. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written material from diverse media. French grammar is studied at a more advanced level.

Prerequisites: FR4242

FR4623 - FRENCH LITERATURE AND CULTURE 3 THE ENLIGHTENMENT

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To examine the development of Enlightenment ideas in France in relation to the social, cultural, and political climate of eighteenth-century Europe to enable students to apply critical skills to the study of eighteenth-century French texts. To develop students' skills in communicating ideas in oral and written French.

Syllabus: Students are introduced to the Enlightenment in France through the study of a selection of cultural and literary texts. Texts are selected with a view to their linguistic accessibility and to their appropriateness on aesthetic, philosophical and historical levels.

FR4923 - FRENCH FOR BUSINESS 3A

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). (i) To deepen student's awareness of key aspects of the contemporary French world of business; (ii) to provide students with an understanding of key aspects of contemporary French and Francophone societies; (iii) to further develop practical language skills (receptive and active); (iv) to promote students critical reading of French literature; (v) to build on the grammatical skills acquired in year 1.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Students are introduced in lectures to the study of social, historical, linguistic, and literary aspects of contemporary France. Themes presented this semester are (i) the French world of work and business, (ii) representations of French modernity in film and literature, and (iii) French discourse genres. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. With the use of authentic material (both written and oral) and with a variety of linguistic activities simulating business environment students are asked to deal competently with tasks encountered in specific situations. The areas of focus include insurance, advertising, and export. Students also study a literary text related to one of the lecture themes. The study of French grammar -in year 1- is continued.

Prerequisites: FR4922

GE4143 - GERMAN LANGUAGE AND SOCIETY 3: LIVING AND WORKING GER

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Linguistic and cultural preparation for Co-op or SOCRATES placements in a German-speaking environment. To explain the German educational system, structures in a German company and in the world of trade and business in general patterns of everyday life. To further consolidate grammatical structures, extend vocabulary and increase accuracy in oral and written German.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany. Tutorials: a) discussion of authentic text material and a literary text to support the lecture; focus on the development of writing skills and cultural awareness; b) grammar in context. Language laboratory: CALL exercises;

language- related exercises based on German TV programs dealing with the issues covered in the lecture.

Prerequisites: GE4142

GE4213 - GERMAN FOR BEGINNERS 3 (APPLIED LANGUAGES)

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). This module completes students' basic language study. It aims to increase student's confidence in writing and speaking German and to both promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany. Tutorials: Students complete their grounding in the basic structures and vocabulary of the German language, focusing particularly on grammar and lexis in context. Students are encouraged to consolidate the skills they have acquired in earlier modules, focusing particularly on the development of speaking and writing skills and cultural awareness. Work is supplemented by short authentic texts on contemporary issues in German-speaking countries. One hour a week is devoted to studying short literary texts, one to prepare students for living and working/studying in a German-speaking environment (application letters, CVS, practice of short interview situations, using the telephone, etc.) Language Laboratory: CALL exercises; language related exercises based on German TV programs dealing with the issues covered in the lecture

Prerequisites: GE4212

GE4243- GERMAN LANGUAGE CULTURE AND SOCIETY 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). To promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment. To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural, and political structures in Germany with a special emphasis on the educational system and employment sector.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany. Tutorial work: one hour text work consolidates skills relating to textual analysis/production, grammar in use and German-English translation; one-hour oral discussion/presentation will also focus on authentic text material (written, video, etc.) relating to the lecture series. Literary texts relating to lectures will also be discussed and examined in the oral and written exams; one hour German linguistics continues with past and current developments in the German language.

GE4623 - GERMAN LITERATURE AND CULTURE 3: ROMANTICISM

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied

Linguistics

Rationale and Purpose of the Module: To give students an insight into German Romanticism as a literary and artistic movement, placing it in a European framework and focusing on its socio-historical background. To examine the legacy of Romanticism in the 19th and 20th centuries. To further improve students' linguistic skills, those needed for dealing with literary texts.

Syllabus: Lecture: critique of the enlightenment; the preromantic (Sturm und Drang); romanticism in Europe; romanticism in art and literature; political romanticism, particularism, and nationalism; Young Germany, Vormõrz, 1848; the legacy of romanticism in the 20th century. Tutorials: discussion and analysis of selected writers of the romantic era including Novalis, E. T. A. Hoffmann, Eichendorff, de la Motte-FouquÚ, Heine and women writers like Bettina von Arnim, Rahel Varnhagen and Dorothea Schlegel. Study of romantic paintings (C. D. Friedrich, P. O. Runge), also of German fairy tales as products of Romanticism.

GE4923 - GERMAN FOR BUSINESS 3A

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural, and political structures in Germany with a special emphasis on the educational system and employment sector. To develop awareness of German companies in Ireland / Irish companies in Germany. To introduce issues in intercultural communication (German/Irish).

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Lecture: education environment: the educational system, universities and university life, work environment: vocational education, industrial relations, company structures, trade unions; Germany as a multicultural country; intercultural communication theory; the media landscape in Germany. Tutorial: discussion of authentic text material and a literary text to support the lecture; focus on the development of writing skills and cultural awareness.

Prerequisites: GE4922

JA4213 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A2+ on the Common European Framework of Reference for Languages (CEFR). To consolidate further students' ability to understand, speak, read, and write Japanese and to further their understanding of Japanese culture and society, particularly relating to the world of work.

Syllabus: This syllabus is set at A2+ on the Common European Framework of Reference for Languages (CEFR). Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests, and asking permission. Reading more demanding and authentic passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also, memos, letters, and notes. Study of a further 170 kanji to bring the total up to 250 characters. Discussion of modern Japanese culture, literature, and films.

Prerequisites: JA4212

JA4913 - JAPANESE FOR BUSINESS 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A2+ on the Common European Framework of Reference for Languages (CEFR). To consolidate further students' ability to understand, speak, read, and write Japanese and to further their understanding of Japanese culture and society, particularly relating to the world of work.

Syllabus: This syllabus is set at A2+ on the Common European Framework of Reference for Languages (CEFR). Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests, and asking permission. Reading more demanding and authentic passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also, memos, letters, and notes. Study of a further 170 kanji to bring the total up to 250 characters. Discussion of modern Japanese culture, literature, and films.

Prerequisites: JA4912

LI4013 - LINGUISTICS 3: RESEARCHING LANGUAGE 1

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module will be offered on the new BA Arts programs. As part of the new BA, a pathway in Linguistics is being introduced. Linguistics modules are very popular electives and attract large numbers of registrations. A high number of students opt for a linguistics focused final year project. As the modules are taught in English, they are very popular choices also with Erasmus and study abroad students. These modules will all be made available as options on the current BA in Applied Languages, thus increasing student choice. The introduction of these new LI modules is therefore designed to meet the institutional strategic objectives of increased student choice and increased opportunities for internationalization. This is the first of two modules designed to provide students with skills in the full range of approaches to studying language in society. These skills are needed for three interrelated purposes: to complement the theories and
principles that that they are learning about in their other modules and go provide them with the necessary skills to apply these to practical contexts; to equip students with the skills required to design and complete a language-focused final year project; to facilitate the student's
development as a life-long reflective researcher of language

Syllabus: The module is practical in nature and will focus on two interrelated aspects: formulating research questions and on types and methods of data collection. The syllabus will be organized as follows: Selecting and formulating research questions in linguistics and sociolinguistics; types of data and methods of data collection - overview; 1. sociolinguistic interviews; 2. written surveys and questionnaires; 3. experimental methods; 4. linguistic landscapes; 5. computer-mediated data and methods.

Prerequisites: LI4212

LI4023 - LANGUAGE AND SOCIETY IN IRELAND

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module will be offered on the new BA Arts programs. As part of the new BA, a pathway in Linguistics is being introduced. Linguistics modules are very popular electives and attract large numbers of registrations. A high number of students opt for a linguistics focused final year project. As the modules are taught in English, they are very popular choices also with Erasmus and study abroad students. These modules will all be made available as options on the current BA in Applied Languages, thus increasing student choice. The introduction of these new LI modules is therefore designed to meet the institutional strategic objectives of increased student choice and increased opportunities for internationalization. Linguistic variation is one of the key components of studying language in society;

this module will offer students an introduction to this topic by focusing on the Irish sociolinguistic context in contemporary and historical perspective.

Syllabus: Following a general introduction to studying language and variation, the module will focus on four main themes: Irish English, The Irish language Irish traveler language, The new languages of Ireland.

LI4113 - LANGUAGE TECHNOLOGY
ECTS Credits: 6 (Year 2 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To introduce students to the major pedagogical, professional and research applications of technology in modern foreign language learning and to enable students to integrate these into their studies.

Syllabus: The module will seek to define and contextualize language learning and Computer-Assisted Language Learning (CALL). It will introduce a number of CALL applications for practical hands-on testing, including Virtual learning Environments, shared workspaces and Social Networking sites. Students will be sourcing, creating, and evaluating on-line resources (covering, for example, blogs, wikis). Dedicated and generic CALL packages will be investigated. The other two main areas for study include Corpus Linguistics (corpora and concordancing) and Machine Translation techniques and application in the context of evaluating their effectiveness in personalized student Language Learning.

LP4003 - LANGUAGE PEDAGOGY 1
ECTS Credits: 6 (Year 2 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module enables students to develop an understanding of the theoretical perspectives which underpin the teaching of languages and the language-learning process; to develop an understanding of the role of language systems and skills in teaching and learning languages; to develop an awareness of classroom management issues. particular to the language classroom; to develop an understanding of effective planning for language teaching; to develop critical understanding of the various syllabi for languages (as set out by the NCCA) to develop an understanding of the national and international context of language teaching and learning.

Syllabus: Theoretical perspectives: theories of language, theories of language teaching and learning, with reference to the Communicative Approach. The practice of language teaching: the teaching of vocabulary, pronunciation, and grammar: productive and receptive skills; balancing skills; culture and language; developing cultural awareness; traditional and new technologies in language teaching/learning; levels; traditional and non-traditional assessment procedures; marking, recording, and reporting; task and project work. Planning: syllabi, schemes and lessons and the relationship between them; alternative post-primary programs (LCA, TYO, LCVP). Context: the professional language teacher nationally and internationally; policy; the place of languages in the post-primary curriculum; links with the primary curriculum; cross-curricular aspects of teaching languages; international links, engendering an openness to other cultures and languages.

SP4003 - SOCIO-POLITICAL ISSUES IN THE CONTEMPORARY HISPANIC WORLD: SOCIETY, CULTURE AND REPRESENTATION
ECTS Credits: 6 (Year 2 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Aims and Objectives: To further develop students background knowledge of the Hispanic World. To explore contemporary socio-political issues and their impact on cultural production in Spain and Latin America. To develop students' analytical skills in the study of contemporary Hispanic culture. To prepare students

to analyze contemporary socio-political issues in the Hispanic World in a critical manner.

Syllabus: This module builds on the foundation modules taken in year one. Students will explore issues of relevance in contemporary society in Spain and Latin America by means of the exploration of up-to-date cultural production about such issues. Accordingly, the module will focus on the politics and representation of gender, cultural constructions of the past and contemporary developments in the construction of national identities. After completion of this module, students will have achieved an in-depth knowledge of contemporary socio-political issues in the Hispanic World and their cultural representation, thus enhancing their understanding of the cultures they will be encountering during their off-campus period.

SP4133 - SPANISH FOR BEGINNERS 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive. Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio- cultural/political issues of contemporary Spain and Latin America.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: further develop the knowledgebase of Spain and Latin America developed in first year and examines some of the salient socio- cultural/political issues of contemporary Spain and Latin America. Tutorials and lab: Working with set textbook, complementary audio-visual, and online material, as well as intermediate difficulty literary texts.

Prerequisites: SP4132

SP4143 - SPANISH LANGUAGE AND SOCIETY 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Second year aims to build on and develop the skills introduced in the first-year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents, and develop further strategies for autonomous language learning.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR).

The advanced course consists of four hours of Spanish per week: One grammar class (grammar review and consolidation). One literature class (a selection of Peninsular and Latin American short stories and newspaper articles), One laboratory/oral class (communication skills). One General Lecture.

Prerequisites: SP4142

SP4163 - SPANISH FOR BUSINESS 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). (i) To facilitate students' further understanding of key aspects of contemporary Hispanic societies, (ii) To deepen students' awareness of key aspects of the contemporary Hispanic world of business, (iii) To build on the grammatical skills acquired in year 1, (iv) To consolidate the techniques necessary to make a short oral presentation on selected topics. (v) To enhance students' reading and analytical skills in the study of Spanish-language texts.

Syllabus: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). There is no syllabus of linguistic items specific to this module, as the main grammatical structures, etc. of Spanish have been covered in previous modules and are consolidated and developed in this and the other remaining modules of the course. Students are introduced to key aspects of contemporary Spain and Latin America. Themes stressed in this semester are (i) The contemporary Spanish world of work and business (ii) Representations of Spain and Latin America in film and literature, (iii) Spanish discourse genres. Oral and aural skills in Spanish are a particular focus, and they are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. Using authentic material (both written and oral) and a variety of linguistic activities simulating the business environments students are trained to deal competently with tasks encountered in specific situations. Areas of focus include Insurance, Advertising and Export.

Prerequisites: SP4162

SP4233 - SPANISH LANGUAGE CULTURE AND SOCIETY 3 (BEGINNERS)

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive. Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio- cultural/political issues of contemporary Spain and Latin America.

Syllabus: This syllabus is set at A2+/B1 on the Common European Framework of Reference for Languages (CEFR). Lecture: further develop the knowledge base of Spain and Latin America developed in first year and examines some of the salient socio-cultural/political issues of contemporary Spain and Latin America. Tutorials and lab: Working with set textbook, complementary audio-visual, and online material, as well as intermediate difficulty literary texts.

Prerequisites: SP4232

SP4243 - SPANISH LANGUAGE, CULTURE AND SOCIETY 3

ECTS Credits: 6 (Year 2 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1+ on the Common European Framework of Reference for Languages (CEFR). Second year aims to build on and develop the skills introduced in the first-year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents, and develop further strategies for autonomous language learning.

Syllabus: This syllabus is set at B1+ on the Common European Framework of Reference for Languages (CEFR). The advanced course consists of four hours of Spanish per week: One grammar class (grammar review and consolidation). One literature class (a selection of Peninsular and Latin American short stories and newspaper articles). One laboratory/oral class (communication skills). One General Lecture. Prerequisites: SP4242

School of Modern Languages and Applied Linguistics Year 3 Modules

GE4925 - GERMAN FOR BUSINESS 5A

ECTS Credits: 6 (Year 3 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). To provide a general introduction to researching business subject matters in German. To consolidate existing language skills and familiarization with the language of marketing, economics, human resources, insurance, and accounting. To prepare students for Cooperative Education

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR). Lecture: Focus on the different specializations within business studies chosen by the students; introduction to key principles of marketing, economics, human resources, insurance, and accounting in German with presentations. Tutorial: a) consolidation of topics discussed in lecture. b) discussion of authentic text material to support the lecture c) strengthening of complex grammatical structures

Prerequisites: GE4924

TE4106 – TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL 1)

ECTS Credits: 6 (Year 3 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide students with an introduction to the Teaching of English to Speakers of Other Languages (TESOL). This is the first of a three-module suite, and starts with an overview of the main approaches and methods in language teaching and learning, the different theories of language and language learning and the concept of learning styles. To enable students to comprehend theoretical aspects of the grammatical and phonological aspects of the English language relevant for teaching purposes. To enable students to develop an understanding of the different levels of language competency of English language learners. This is the first of a three-module suite, students also complete TEXXXX (TESOL 2) and TEXXXX (TESOL 3). This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. TEXXXX (TESOL 1) and TEXXXX (TESOL 3) are offered in the Spring semester; TEXXXX (TESOL 2) is offered in the Autumn semester. Note: This suite of modules replaces TE4025 (TEFL 1), TE4026 (TEFL 2) and TE4028 (TEFL 3). The roll out of this new stream of TESOL modules will not affect students currently completing the TEFL suite of modules, and they will exit with a TEFL certificate. New entrants in the academic year 2014/15 will start the new TESOL suite of modules

Syllabus: The module integrates three independent but related components: 1. Methods and approaches: Grammar Translation Method, the Direct method, Situational Language Teaching, Audiolingualism, Total Physical Response, the Silent Way, Suggestopedia, Community Language Learning, The Natural Method, Communicative Language Teaching, Task Based Learning, the Lexical Approach, Eclecticism. The Theory of Multiple Intelligences. 2. Grammatical concepts: Word classes: Lexical words (nouns, verbs, adjectives, adverbs); Function words (determiners, pronouns, prepositions, coordinators); Phrase, clause and sentence structure: The Verb Phrase (time, tense, aspect, mood); The English Tense System. 3. English Phonetics and Phonology: individual vowel and consonant sounds ,basic transcription. Suprasegmental aspects of speech: intonation, stress, rhythm. Pronunciation differences between Received Pronunciation and Irish English.

JA4915 - JAPANESE FOR BUSINESS 5 ECTS Credits: 6 (Year 3 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B1 on the Common European Framework of Reference for Languages (CEFR). To

consolidate students' abilities to comprehend, read, speak, and write Japanese developed up to now and to develop further their ability to deal with material relating to Japanese culture and business particularly in the world of work.

Syllabus: This syllabus is set at B1 on the Common European Framework of Reference for Languages (CEFR). Listening comprehension, particularly authentic news broadcasts about business topics; readings about contemporary Japanese life and business; spoken exercises, particularly short presentations, and workplace-related conversations; writing of short reports and summaries as well as students' own opinions on everyday topics.
Prerequisites: JA4914

SP4165 - SPANISH FOR BUSINESS 5
ECTS Credits: 6 (Year 3 Module)
School of Modern Languages and Applied Linguistics
Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). To prepare students for the work placement in semester 6. This is achieved: by developing students' knowledge of Spanish for Specific Purposes through focusing on cultural aspects which will be encountered in and outside the workplace while residing in the target country. To this end teamwork and further development of intercultural understanding is strongly facilitated and encouraged.

Syllabus: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). The Spanish for Business 5 module provides students with a platform to broaden and advance their experience of language learning. Language and culture are interwoven through the four distinct parts of the module. In the material on stereotypes, students are introduced to analytic tools (semiotic analysis, stereotypes and advertising strategies, film analysis, etc) to study particular cultures and identities. Translation work on newspaper articles is undertaken in order to foster awareness of the vital link between culture and language learning. In addition, students conduct research on a Latin American or Spanish company via the Internet (company website and other Internet sources) and complete a task-based Internet project. Students also work on case studies related to Business issues. This last component includes writing business correspondence with contextualised grammar revision. Prerequisites: SP4166

School of Modern Languages and Applied Linguistics Year 4 Modules

CU4011 - COMPARATIVE LITERATURE: CRIME FICTION AS CRITICAL MEMORY
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This interdisciplinary module examines literatures from different linguistic and cultural contexts comparatively, both from the point of view of theory, and in practice. More specifically, it combines Crime Fiction Studies with Memory Studies. The students will be introduced to theoretical approaches to both comparative literature and the development of the crime genre and apply these to contemporary crime novels from a variety of cultural contexts. In particular, the module will explore the ways in which such texts enable critical inquiry into common experiences past and present across cultures. The focus is on how the crime genre is used to critically explore a traumatic and silenced past and its continuing impact on the present. In their analyses of these texts, students will discuss issues of

memory, identity, and functions of (popular) literature and film. The module will also provide the setting for further developing the students' critical and analytical skills in the study of literature.

Syllabus: The course is structured as follows: 2 hours b/b of lectures per week in which the students will be introduced to the concept of comparative literature, the development of the crime genre (Edgar Allan Poe, Arthur Conan Doyle, Raymond Chandler), and, following on from this, to a range of crime novels and films from different cultural and language backgrounds (e.g. Austrian, French, German, Irish, Italian, Japanese), which involve a historical dimension and issues of individual and collective memory and the investigation of a silenced past.

CU4037 - EUROPEAN CINEMA FROM ITS BEGINNINGS TO THE 1950s

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The module intends to give students an overview over the major developments in the various European national cinema traditions up to the end of the 1950s. It aims to introduce students to basic concepts of film historiography as well as key issues of the periods studied such as the role of film within popular culture, aesthetical debates, and theories before and after the introduction of sound films, the mutual influences of American and European cinema. The focus of this module will be on the development of Soviet, French, German, Spanish, Italian and Scandinavian Cinema.

Syllabus: Principles of film history; Europe vs. America; the concept of National Cinema; aesthetics of silent vs. sound films; literature vs. moving images; visions of modernity; images of technology and science fiction. Aspects covered will include Beginnings (Lumiþre brothers, Georges Meliþs); Nordisk Film Companie; Film and World War I; Soviet Cinema (Montage, Eisenstein, Dziga Vertov); Weimar Cinema (Expressionism, Fritz Lang, Murnau, mountain films, proletarian cinema, Marlene Dietrich); French cinema (Gance, Renoir); Nazi Cinema (cinema as propaganda; Riefenstahl); Italian Neo-Realism (Rossellini, de Sica), Spanish Cinema (Berlanga, Bunuel).

FR4147 - FRENCH LANGUAGE AND SOCIETY 5 FRANCE, EUROPE, AND B

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). This module is an introduction to contemporary social, economic, and political life in France in a European and global perspective. This is achieved: by developing students' knowledge of French culture and society by focusing on the country's cultural, social, and political aspects by encouraging team-work and intercultural understanding. By focusing on key moments in the history of France in European affairs and that of France with the francophone communities, language varieties in France and the francophone countries.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). The module provides students with a platform to broaden and advance their experience of language learning. Language and culture are interwoven through the four distinct parts of the module. In the lectures, students are introduced to analytic tools to study particular social political and cultures aspects. In the tutorials, analysis work of newspaper articles is undertaken making students aware of the vital link between culture and language learning. In short, the module is centered on a series of lectures analyzing the major issues with respect to France and wider world. Language tutorials review some of the points raised in the lectures through close reading and discussion of authentic texts related to the lectures. Language tutorials also endeavor to develop written skills in the French language through translation and/ or

essay writing. Tutorials are also devoted to the study of a literary text closely related to the subject matter.
Prerequisites: FR4146

FR4247 - FRENCH LANGUAGE CULTURE AND SOCIETY 5
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). This module aims: (i) to enable students to develop their written and oral language skills; (ii) to provide a detailed study of aspects of France in a European and global perspective; (iii) to provide an understanding of the postcolonial cultural context through a study of selected literary texts; (iv) to provide practice in translation in the context of theoretical issues in Translation Studies.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). The module is centered on a series of lectures analyzing the major issues with respect to France and wider world. Tutorials explore some of the issues raised in the lectures through close reading and discussion of relevant authentic texts. Language tutorials focus on the theory and practice of translation in two specific contexts (literature and computer science). Literary tutorials are devoted to the study of a selection of poems from the 1930s to the 1960s and of a francophone African novel
Prerequisites: FR4246

FR4627 - FRENCH LITERATURE AND CULTURE 5: INTELLECTUAL MOVEMENTS
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To study modern intellectual movements in France in the context of crisis and change in French society and culture in the twentieth century. To enable students, engage critically with cultural theories, and to apply such theory to their understanding and analysis of modern French texts. To develop students' skills in communicating ideas in oral and written French.

Syllabus: Two/ three topics will be chosen each year, and a variety of theoretical and literary texts will be addressed in relation to each topic, for example existentialism; structuralism/semiology; post-modernism; feminist theory.

FR4927 - FRENCH FOR BUSINESS 7A
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). While building on previously acquired reading, speaking, writing, and listening skills, the course aims to enhance student's ability to engage with and express effectively ideas and concepts through the means of the target language by analysing primary sources relating to institutions and policies of the EU and the place and role of France within Europe - by giving students opportunities to practice their oral and written skills (e.g. video-viewing tasks) by encouraging team-work and intercultural understanding via collaborative learning with Erasmus students.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). The French for Business 7 module provides students with a language-rich environment to further their knowledge and increase their confidence. In the lecture, students are introduced to the main policies and institutions governing the European Union and issues regarding its unity and diversity. In the tutorials, students are taught the techniques necessary to make a detailed presentation on social or economic issues using statistics, graphs and key phrases. In addition, through the study of TV documentaries and news

bulletins students explore French and European society and culture from a linguistic and socio-economic point of view. Finally, students study a literary text related to the module title, currently, VoltaireÆs Candide.
Prerequisites: FR4925

GE4147 – GERMAN-LANGUAGE AND SOCIETY 5: GERMANY EUROPE AND BEYOND
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). To examine Germany's role in present-day Europe and explore the interrelatedness of German social and cultural developments with those of its neighbours. To develop intercultural awareness and communication skills. To continue the study of more complex literary texts in German. To develop translation skills and enhance students' presentation skills in the foreign language.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations. Tutorials: a) discussion of texts connected with the lecture; contrastive cultural studies including students' presentations in the foreign language; b. grammatical exercises c) graded translation exercises focusing on German/English translations.
Prerequisites: GE4146

GE4247 – GERMAN-LANGUAGE CULTURE AND SOCIETY 5
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). To examine Germany's role within Europe and beyond and explore points of contact between Ireland and Germany; to continue improvement of text analysis and oral, reading and writing skills, to revise further problem areas in German grammar and increase students' confidence in using more complex grammatical and syntactic structures. To continue the systematic study of translation theory and practice, introducing students to a range of text types and registers.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations. Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (analysing tone & register; reporting and commentary); Text analysis & production; contemporary literature; Translation theory and practice: scientific, economic, and journalistic texts.

GE4627 - GERMAN LITERATURE AND CULTURE 5: ASPECTS OF 20TH CENTURY LITERATURE
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To examine aspects of 20th century writing in German through close study of individual texts.

Syllabus: The works covered in this module may be drawn from the Expressionist Movement, Weimar and exile literature, and post-war writing. Aspects that may be considered include literature and cultural identity, the role of literature in political change, the writer as a social critic and women's writing.

GE4927 - GERMAN FOR BUSINESS 7A ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). To examine Germany's role in present-day Europe and explore the interrelatedness of German social and cultural developments with those of its neighbours. To develop intercultural awareness and communication skills, especially in a business context. To develop translation skills and enhance students' presentation skills in the foreign language. To expand on knowledge and skills acquired during Cooperative Education.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Lecture: Germany and its neighbours; Germany and the Third World; German economic and cultural activities abroad; national images and their origins; the image of Germany abroad and the German self-image; German/Irish relations. Tutorials: a) discussion of texts connected with the lecture; contrastive cultural studies including students' presentations in the foreign language; b. business text analysis and production, consolidation of language skills in a range of registers c) translation theory and practice, focusing on German/English scientific, economic, and journalistic texts.
Prerequisites: GE4925

JA4247 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 5
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). This module consolidates and extends students' abilities in listening and reading comprehension, spoken, and written intermediate-level Japanese. It also introduces translation from Japanese to English of a variety of literary and other contemporary texts.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR). Listening practice consolidating functions and vocabulary studied up to now, authentic listening from a variety of sources. Speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of broadcast and reading material at various levels. Reading of authentic or near-authentic passages at intermediate-level. Translation of a variety of passages into English. Writing practice involving summaries, descriptions, and letters of various levels of formality. Study of a further 170 kanji, to bring the total to 550 characters. Introduction of authentic material by modern Japanese authors.
Prerequisites: JA4246

JA4627 - JAPANESE LITERATURE: POETRY, DRAMA, PROSE
ECTS Credits: 6 (Year 4 Module)
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To survey the development of characteristically Japanese literary genres - tanka, haiku, kabuki, bunraku - examine their modern manifestations, to enable students to apply critical skills to the study of current Japanese texts; to develop students' skills in communicating in oral and written Japanese.

Syllabus: The module allows students to improve their ability to speak and write Japanese by analysing developments in Japanese literature and culture through close reading and analysis of a range of representative texts. The module will further develop students' written skills through translation and/or essay writing as well as developing spoken skills through in-class discussion.

JA4917 - JAPANESE FOR BUSINESS 7
ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2 on the Common European Framework of Reference for Languages (CEFR). This module consolidates and extends students' abilities in listening and reading comprehension, spoken, and written intermediate-level Japanese. It also introduces translation from Japanese to English of a variety of literary and other contemporary texts.

Syllabus: This syllabus is set at B2 on the Common European Framework of Reference for Languages (CEFR). Listening practice consolidating functions and vocabulary studied up to now, authentic listening from a variety of sources. Speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of broadcast and reading material at various levels. Reading of authentic or near-authentic passages at intermediate level. Translation of a variety of passages into English. Writing practice involving summaries, descriptions, and letters of various levels of formality. Study of a further 170 kanji, to bring the total to 550 characters. Introduction of authentic material by modern Japanese authors.

Prerequisites: JA4915

LI4017 - LINGUISTICS 5: MULTILINGUALISM IN A GLOBALIZING WORLD

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module will be offered on the new BA Arts programme. As part of the new programme, a pathway is being developed in Linguistics with TESOL, and this module is part of the pathway. Linguistics modules are very popular electives and attract large numbers of registrations. A high number of students opt for a linguistics-focused final year project. As the modules are taught in English, they are very popular choices also with Erasmus and study abroad students. These modules will all be made available as options on the current BA in Applied Languages, thus increasing student choice. The introduction of these new LI modules is therefore designed to meet the institutional strategic objectives of increased student choice and increased opportunities for internationalization. An understanding of multilingualism is a crucial aspect of linguistics; in addition, research in multilingualism is a key strength of faculty in the Centre for Applied Language Studies.

Syllabus: The module will be organized around the following components: Understanding and measuring linguistic diversity, old and new models of multilingualism, Individual and societal multilingualism, Multilingualism and migration, Multilingualism and education, Lingua Francas and global English, Multilingualism and technology.

SP4007 - MODERN TRENDS IN HISPANIC CULTURE AND THE ARTS

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module offers an introduction to the main artistic forms of expression in the Hispanic world which constituted a break with the traditional canons and therefore signalled the beginning of modernity both in Latin America with the movement of 'Modernismo' and in Spain with the work of the Romantic poet Gustavo Adolfo BÚcquer who can be considered a precursor of modern poetry. These artistic forms were the beginning of a move towards modernity which culminated in Surrealism during the second decade of the 20th century. In Spain, after the civil war, artistic resistance to the dictatorship developed in the context of severe censorship and in this respect the module will also deal with cultural forms of resistance to the dictatorship of General Franco.

Syllabus: This module will focus on five areas: The Spanish Romantic period in art and poetry (Goya and BÚcquer), Latin American 'Modernismo' and its

legacy in Spain in the form of the 'Generación del 98', The Poetry of Pablo Neruda, The Spanish 'Generación del 27' and the Spanish avant-garde: Surrealism in art and literature, Cultural forms of resistance to the Franco regime: The theatre of Buero Vallejo and the 'New Song', a form which often pays tribute to the Spanish poetic tradition.

SP4147 - SPAIN EUROPE AND BEYOND

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). By the end of this module students should have: 1. developed further their command of Spanish, by focusing on oral, aural, reading and writing skills. 2. a greater analytical awareness of linguistic issues, developed through translation and critical text analysis activities. 3. a deeper critical understanding of contemporary society, in particular, because of the study of contemporary literature and other text types. 4.the ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Central focuses of the syllabus, in addition to the development of overall language competence, are cultural, linguistic, and political aspects of Spain and Latin America, issues of relevance to both Spain and Ireland and Hispanic perspectives on European and global questions. The module places a particular linguistic emphasis on questions of register and style in Spanish.

Prerequisites: SP4146

SP4247 - SPANISH LANGUAGE, CULTURE AND SOCIETY 5

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is set at B2+ on the Common European Framework of Reference for Languages (CEFR). By the end of this module, students should have developed further their command of Spanish, by focusing on oral, aural, reading and writing skills. A greater analytical awareness of linguistic issues; developed through translation and critical text analysis activities. A deeper critical understanding of contemporary society, in particular, because of study of contemporary literature and other text types. The ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.

Syllabus: This syllabus is set at B2+ on the Common European Framework of Reference for Languages (CEFR). Central focuses of the syllabus, in addition to the development of overall language competence, are cultural, linguistic, and political aspects of Spain and Latin America, issues of relevance to both Spain and Ireland and Hispanic perspectives on European and global questions. The module places a particular linguistic emphasis on questions of register and style in Spanish.

Prerequisites: SP4246

TE4107 - TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL) 2

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give students a theoretical and practical understanding of classroom teaching in the ESOL context, including: an introduction to lesson planning; teaching productive and receptive skills; teaching vocabulary, grammar, and pronunciation relevant to the ESOL context. To enable students to develop a more advanced knowledge of the grammatical and phonological aspects of the English language relevant to TESOL. To give students the opportunity to practically apply aspects of the above knowledge through peer teaching or teaching practice. To allow

students to develop an understanding of the different levels of language competency in the ESOL classroom. This is the second of a three-module suite, preceded by TEXXXX (TESOL 1) and followed up by TEXXXX (TESOL 3). This suite of modules is intended to give students a foundation in Teaching English to Speakers of Other Languages which is validated by TESOL certification from the University of Limerick. TEXXXX (TESOL 1) and TEXXXX (TESOL 3) are offered in the Spring semester; TEXXXX (TESOL 2) is offered in the Autumn semester. Note: This suite of modules replaces TE4025 (TEFL 1), TE4026 (TEFL 2) and TE4028 (TEFL 3). The rollout of this new stream of TESOL modules will not affect students currently completing the TEFL suite of modules, and they will exit with a TEFL certificate. New entrants in the academic year 2014/15 will start the new TESOL suite of modules.

Syllabus: The module is structured into three independent but related components: 1. A theoretical and practical introduction to ESOL classroom teaching to include the teaching of the receptive skills (reading and listening) and productive skills (writing and speaking), the teaching of vocabulary and semantic concepts and the teaching of grammar and pronunciation. 2. The further development of knowledge in relation to grammatical aspects of the English language to include active and passive voice and direct and indirect speech and the development of a more advanced understanding of the English sound system at both the micro-level and the macro-level. The practical application of the above knowledge through practice.

Prerequisites: TE4025

CU4027 - VISUAL CULTURAL STUDIES

ECTS Credits: 6 (Year 1/2/3/4 Module)

School of Modern Languages and Applied Linguistics

Note: This is an online module

Rationale and Purpose of the Module:

The aim of this module is to provide students with a comprehensive overview of the transdisciplinary formations of visual culture and visual cultural studies. Students will develop an understanding of; * the ways in which visual texts have emerged as a dominant mode of cultural communication * how visuality has emerged as a primary concern within a range of disciplinary formations such as cultural studies, film studies, media studies, sociology, and technology.

Syllabus: The course will survey the field of visual cultural studies from the transition between the painting and the mechanical reproduction of images. It will deal with the problem of photography as a reflection of reality, as gaze and as surveillance The gendering of the image in painting, advertising and cinema will be covered the module will deal with the notion of virtuality and the critiquing of the internet. Race and globalization as they are theorized and represented will form the basis of the last part of the module. Readings will form the basis or lectures and tutorials as well as the screening of films and television productions. Analytic tools of image.

LI4037 - APPLIED LINGUISTICS AND THE PROFESSIONS

ECTS Credits: 6 (Year 4 Module)

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module:

This module maps applied linguistics to some of the the many areas within which language based issues are implicated, such as institutional discourses - legal, media, educational, political, amongst others. The module builds connections between these inter-related areas and language-problem-related orientations as modes of enquiry, and guides participants to methods of exploring problems and needs within applied linguistics.

Syllabus: The module introduces theoretical and analytical backgrounds connected to applied linguistics and the professions. Key areas include the language and cultural politics of the media in terms of power relationships, ownership, representation, cultural bias, and linguistic commentary in the media. The syllabus is responsive, and indicative areas of

interest include education (especially second language teaching and learning); professional talk and institutional/workplace discourse; intercultural communication more generally; language and the legal professions in applied linguistics, such as forensic linguistics; language description and exploration - lexicography; stylistics, and broader areas such as political discourse.

School of English, Irish, & Communications

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

School of English, Irish, and Communication Year 1 Modules

GA4011 - CELTIC CIVILISATION: CULTURE, LANGUAGE AND REPRESENTATIONS

ECTS Credits: 6 (Year 1 Module)

School of English, Irish and Communication

Rationale and Purpose of the Module: To offer an introductory module in Celtic Civilisation for the Autumn Semester encompassing heroic Celtic literature, the history of the Celts and of the Celtic languages, as well as interpretation of the earliest accounts of the Celtic peoples and their customs and beliefs.

Syllabus: This module will give an overview of the history of Celtic languages, culture and literature, focusing on the following: •an introduction to theoretical and scholarly debates on the origin of the Celtic speaking peoples •Celtic prehistory and archaeology; customs and way of life •critical interpretation of the earliest accounts of Celtic people •the history and current position of the Celtic languages •introduction to Early Irish Heroic Tales and representations of the heroic in Early Welsh Literature

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GA4171 - IRISH LANGUAGE AND CULTURE 1

ECTS Credits: 6 (Year 1 Module)

School of English, Irish and Communication

Rationale and Purpose of the Module: This introductory module aims to develop the linguistic and cultural competence of students new to the Irish language. Following an overview of the history of the language and its literary tradition, the focus in the lecture series is on the Irish language in its contemporary context and the interplay between traditional and contemporary culture and society. The course is organised thematically around the Teastas Eorpach na Gaeilge (TEG) Beginner A1 Level language themes and an integrated lecture series where the cultural roots of the language are explored. The language topics are: prounciation, sounds and stress patterns, basic greetings and meeting people, background and place of residence, the family, pastimes, and daily routines. Cultural topics are: myths and misconceptions about the Irish language, relationship between Irish and other European languages, particularly other Celtic languages; An Ghaeltacht; Irish placenames; Irish surnames, some prominent Irish families; intergenerational language transmission; the Irish poetic tradition, the Irish language in cultural movements and the arts, the Irish language and media, and the Irish language and sport.

Syllabus: The course is organised thematically around the Teastas Eorpach na Gaeilge (TEG) Beginner A1 Level language themes and an integrated lecture series where the cultural roots of the Irish language are explored. The language topics are: pronunciation, sounds and stress patterns, basic greetings and meeting people, background and place of residence, the family, pastimes, and daily routines. Cultural topics are: myths and misconceptions about the Irish language, relationship between Irish and other European languages, particularly other Celtic languages; An Ghaeltacht; Irish placenames; Irish surnames, some prominent Irish families; intergenerational language transmission; the Irish poetic tradition, the Irish language in cultural movements and the arts, the Irish language and media, and the Irish language and sport.

EH4141- English Literature 1: Novels and Short Fiction

ECTS Credits: 6 (Year 1 Module)

School of English, Irish, and Communication

**This module is only available to Freshman Students (1st Year students) Places limited to 10. **

Rationale and Purpose of the Module: This module aims to develop the skills of literary analysis and criticism with a focus on English literature and on novels and short fiction in particular.

Syllabus: Intended as a foundational course for students moving from second to third level models of studying literature(s) in English, students will be introduced to the basic skills necessary to develop critical readings of literary texts. Literary genres will be addressed within the module with primary texts drawn from British and American prose fiction. Basic elements of literary theory will also be introduced.

JM4061 - JOURNALISM, POLITICS AND SOCIETY

ECTS Credits: 6 (Year 1 Module)

School of English, Irish and Communication

Limited capacity – Please contact Module Leader

Rationale and Purpose of the Module: Journalism, Politics and Society acts as an introduction to journalism theory including the role of journalism in politics and wider society. The module will enable students to think critically about journalism and its role in society. The module introduces the student to key concepts of journalism from the liberal, critical and constructivist schools amongst others. The module will introduce students to the concepts of the fourth estate and the public sphere and their historical origins. The module will go on to discuss the changing nature of the fourth estate and the public sphere including contemporary forms journalism and communications. Journalism, Politics and Society will also teach a working knowledge in political structures in Ireland and internationally

Syllabus: On successful completion of this module students will demonstrate an understanding of critical thinking skills and how to perform a critical reading of journalistic content; graduates will demonstrate an understanding of the various roles of journalism in contemporary society alongside the structural constraints of journalistic production including ownership, editorial decision making and working practices. On successful completion of the module graduates will be able to apply these basic concepts to all areas of journalism whether print, digital or broadcast. On successful completion of the module students will demonstrate a knowledge of the journalistic production process. On successful completion of the module students will demonstrate a knowledge of the interaction between political structures and processes and the media sphere. Including the historical development of the state and public sphere graduates will demonstrate a knowledge of key Irish and European contemporary political structures.

TW4001 - DIGITAL MEDIA AND COMMUNICATION

ECTS Credits: 6 (Year 1 Module)

School of English, Irish and Communication

Rationale and Purpose of the Module: This module will be a core module on the BA in Journalism and Digital Communications and core on the Digital Culture and Communications stream on the BA Arts and BSc in Social Sciences. It introduces students to key concepts relating to digital media and communication, while also developing practical and analytical skills.

Syllabus: Introduction to digital media and communication. The development of computer media. The influence of technology on cognition, communication, and work. Case studies will consider the influences, consequences and interrelationship of media and communication, including examples from the world of work, education, video games, social media, and ubiquitous computing. Students will develop digital content through practical exercises in labs.

School of English, Irish, and Communication Year 2 Modules

EH4023 - THE NEW WORLD: AMERICAN LITERATURE TO 1890

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Limited capacity

Rationale and Purpose of the Module: This module offers students a survey of some of the primary literary themes and cultural concerns that have contributed to the formulation of a distinct tradition of American literature from the initial colonisation of the continent to
1890.

Syllabus: American literature pre-1620 (for examples, Columbus, de Vaca, Harriot, Smith): American literature from 1620 to the early 18th century (for example, Bradford, Bradstreet, Rowlandson, Byrd); the Puritan influence (for example, Williams, Taylor, Mather, Edwards); the Age of Enlightenment and Revolution
1750-1820 (for example, Paine, Jefferson, The Federalist, Murray); 19th century American literature(for example, Emerson, Hawthorne, Thoreau, Whitman, Melville, Dickinson); incipient American modernism.

EH4043 - IRISH LITERARY REVOLUTIONS 1880 - 1930

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Limited capacity

Rationale and Purpose of the Module: This module replaces and re-situates in second year an earlier first year module (EH4111-- The Irish Literary Revival). It is a revised and updated module which covers the period of the Revival but also broadens the canon. It will introduce students to a range of Irish literary work and cultural movements in the period 1880-1930. It aims to introduce students to selected literature from this revolutionary period in Irish culture, attending to innovations in style, structure, and genre in the period, and concentrating on formal as well as cultural
experimentation. Background: from the 1880s on, the
'Irish Question' was a central site of struggle in British and Irish public discourse, and in this turbulent period a new generation of writers began to interact with this and other questions in their literary work. Writers such as W. B. Yeats, J. M. Synge, Lady Gregory, George Moore, and Eva Gore-Booth identified (temporarily, in some cases) with cultural nationalism, and became associated with the Irish Literary Revival and cultural arenas including the Abbey Theatre and the Gaelic League. Decadent and 'New Woman' writers Oscar Wilde, George Egerton, and Sarah Grand, resisted hegemonies of a different kind, subverting gender and sexual identities and challenging prescribed roles in the family. Against the backdrop of an emerging socialist movement, writers such as G. B. Shaw and Seán O'Casey, tackled class activism; while others, including Anna Parnell, Roger Casement, Ernie O'Malley, and Maud Gonne began to write autobiographical accounts of their involvement in Irish national struggles. Over the course of this period, the work of James Joyce began to draw on these radical discourses and other transnational literary movements in the production of his important literary experiments.

Syllabus: Exploring selected Irish writers and literary movements 1880-1930, this module aims to introduce learners to one of the most radical periods in Irish culture. Attending to formal and cultural experimentation, and drawing on a range of literary genres, the module will explore the local and transnational dynamics of the Irish literary world. By developing a "thick description" of the period, the module aims to enable students to become better critical thinkers and literary researchers by focusing on close reading, on comparative studies of different writers and (sometimes intersecting) literary movements, and on the reception and critical analysis of this material at the time and since.

EH4073 - DRAMA: MEDIEVAL AND EARLY MODERN

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Rationale and Purpose of the Module: This module focuses on literature produced in the period c. 1400-1700. Students will read a variety of early dramatic texts in English, focusing on topics and themes and major concerns as well as the conditions of performance and the impact on the literary text of developments in theatre. It will also broaden understanding of the social and political cultures of the late Middle Ages and early modern period.

Syllabus: This module is an introduction to late-medieval cycle drama (morality and mystery plays) and to early modern dramatic plays and masques (court dramas), written and performed in both Ireland and Britain. Students will encounter late Middle English, the language of the period from 1300 onwards, learning to read and critically appraise it in the relatively accessible form of drama. The module looks at the progression of dramatic traditions and conventions into the Tudor and Stuart periods, focusing on major authors as well as lesser-known playwrights, but also examining the geographies of drama, as performances shift from city- and town-based cycle plays to private and court theatre and, eventually, to the public playhouses. A further concern will be with how playtexts survive, and the threshold between performed and physical text. Furthermore, the module will also consider the effects of social, religious and political change (e.g. Reformation, conflicts) on the political concerns of texts.

EH4053 - AUGUSTAN AND ROMANTIC LITERATURE

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Limited capacity

Rationale and Purpose of the Module: This module is designed to draw together and combine the current first year Restoration and Augustan Literature module and the second year elective module Sensibility and Romanticism to offer a broader and more inclusive survey of British and Irish Literature between 1660 and 1830. This innovation is intended to offer students a more comprehensive 'long' eighteenth-century option in second year in the proposed new BA.

Syllabus: The aim of this course is to provide students with a survey of literature in English between the Restoration of the British monarchy in 1660 through to the democratic reforms of 1830. This course aims to immerse students in the literary language of the time across several genres. We will first look at contexts for the emergence of modern genres such as the polemical pamphlet, the novel, and the journalistic essay. In this first part of the course is studied the prose and poetic writings of figures such as Aphra Behn, Jonathan Swift, Alexander Pope, Mary Wortley Montagu, and Oliver Goldsmith.

In its second half this module provides students with a survey of literature of the eighteenth and early nineteenth centuries, a period in which literature was involved with, and inspired by, revolutionary political activity. The writers of this period grappled with issues of race, slavery, gender, democracy, and republicanism. We will trace a shift from a negative and trivialising concept of 'the romantic' towards the more complex Romantic cults of Nature and Imagination, thought through in the context of intense friendships and collaboration between clusters of poets and critics. We will survey the writings Robert Burns, Williams Blake, William Wordsworth and Samuel Taylor Coleridge, Jane Austen, Percy Bysshe and Mary Shelley, among others.

JM4003 - INTERVIEWING AND REPORTING

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Rationale and Purpose of the Module: Interviewing and reporting aims to develop students skills at researching and carrying out interviewing face to face and by telephone, and covering a patch as for a local newspaper.

Syllabus: Students will study interviewing in depth, learning how to select interview subjects, research topics and prepare for the interview. They will carry out a face- to-face interview with a newsmaker in class, reflect on that interview and the ones by

fellow classmates, and write up both their own and classmates interviews as news stories. They will research and carry out a telephone interview. During the second half of the semester students will be assigned to a local patch, from which they will, with the guidance of the tutor, produce a portfolio including a report on the area, off diary and on diary stories and short features, with suitable pictures. This material must be designed into pages for a dummy local paper. Classes throughout the semester will include revision on news writing as the students develop and polish their stories. Assessment will be by coursework: production of a portfolio of interviews and a folder of work from the students patch, and a timed exam on news writing and editing

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TW4003 - INTRODUCTION TO TECHNICAL COMMUNICATION

ECTS Credits: 6 (Year 2 Module)

School of English, Irish, and Communication

Rationale and Purpose of the Module: This module is designed to replace TW4115: Principles of Professional and Technical Communication and Information Design. This module is being developed to fully de-couple undergraduate and postgraduate modules which were historically taught together but are now fully separate. The new title is also clearer. The module's purpose is to introduce students to the disciplines of technical and professional communication and information design; to establish a rigorous standard in the writing of clear, concise, correct English appropriate for technical communication; to develop the students' ability to choose appropriate writing styles for a range of technical communication genres and diverse audiences; to provide practice through a range of assignments designed to improve the students' performance in creating different types of documentation: summaries, brochures etc.; and to develop the students' expertise in using the tools of the profession. This module introduces technical communication for different genres. More advanced modules include content on referencing and academic writing.

Syllabus: Introduction to technical communication; audience analysis; writing style for technical communication; information design; typography; colour; graphics and illustrations; technical communication genres; writing summaries; designing and writing brochures.

EH4121 – GOTHIC LITERATURE IN IRELAND

ECTS Credits: 6 (Year 2 Module)

School of English, Irish and Communication

Limited capacity

Rationale and Purpose of the Module: Haunted castles, resurrected bodies, murderous monks, blood-thirsty vampires, and preyed-upon heroines - these are some of the things we expect from a text advertising itself as 'Gothic'. But, what does 'Gothic' really mean? When did it emerge as a recognisable cultural phenomenon, and why? How did Irish authors contribute to this new popular literature? This module will address these questions, and, in so doing, provide an introduction to the emergence of a 'Gothic' aesthetic in Ireland, Britain, and Europe over the course of the eighteenth and nineteenth centuries. This module replaces an older first semester module on the Irish literary Revival (now updated and included in a second year elective suite). This new module on the gothic is intended as a first year, first semester introduction to genre, in this instance, the genre of gothic. It aims to introduce students to the emergence and development of a recognisable gothic aesthetic in the literature of the eighteenth and nineteenth centuries. To achieve this aim, it will examine, among other things, contemporary definitions and reception of gothic literature; the Sublime; the formal and generic variations of the literary gothic; and twentieth- and twenty-first century perceptions of gothic literature from the period c. 1750-1830.

Syllabus: This module will introduce students to a chronological progression of texts intended to provide a detailed picture of the emergence of the literary gothic in eighteenth- and nineteenth-century Ireland, Britain, and Europe.Assessing a mixture of poetry, prose, and drama, students will

come to appreciate the multi-generic nature of the literary gothic as well as the social, cultural, and political contexts in which it was produced. Students will also explore and interrogate the burgeoning area of gothic literary studies, developing, as they do so, a nuanced understanding of both the literature we now describe as 'Gothic' and modern day critical assessments of such literature.

School of English, Irish, and Communication Year 3 Modules

GA4105 - IRISH FOLKLORE 1
ECTS Credits: 6 (Year 2 & 3 Module)
School of English, Irish, and Communication

Rationale and Purpose of the Module: To introduce students from various disciplines (e.g., anthropology, comparative religion, ethnology, history, literature, sociology, etc.) to the area of folkloristics and to the study of Irish folklore.

Syllabus: An introduction to Irish folklore with special reference to the following areas: definitions of folklore, folklore collection and classification; verbal arts and minor genres; story-telling and narrative genres; indigenous and international tale-types in Ireland; and traditional custom and belief, including calendar customs

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School of English, Irish, and Communication Year 4 Modules

EH4007 - LITERARY MODERNISM
ECTS Credits: 6 (Year 4 Module)
School of English, Irish, and Communication
Limited capacity

Rationale and Purpose of the Module: This module studies British literature from the turn of the twentieth century to the end of the Second World War. Students will explore the turn to interiority and experimental modes of writing and will become familiar with major historical, political and social factors involved in this turn. Topics will include the impact of the two world wars; the influence of major theorists of the mind such as Freud, Jung, William James and Melanie Klein; the cross- fertilisation of the arts, including painting, film and photography; the role of the Cambridge Ritualists and the archaeological discoveries; the battle for suffrage and the subsequent debate about the nature of gender and the relation between and among the sexes.

Syllabus: This module covers British literature from 1900-1945. Writers will include major novelists of the period such as E.M. Forster, D.H. Lawrence, Virginia Woolf and James Joyce; and/or major poets such as T.S. Eliot, William Butler Yeats, W.H. Auden and the poets of the First World War. In defining the themes and interpreting the literature of the period, attention is paid to political, social and cultural constructs (for example, the World Wars, the suffrage movement, the impact of other art forms), to significant concepts and philosophies (for example, Primitivism, psychoanalysis, physics) and to literary movements (for example, Bloomsbury).

EH4017 - CONTEMPORARY AFRICAN LITERATURE IN ENGLISH
ECTS Credits: 6 (Year 4 Module)
School of English, Irish, and Communication
Limited capacity

Rationale and Purpose of the Module: On successful completion of this module, students will be able to apply a critical and cogent awareness of Contemporary literature from across the African continent
Multiple socio-political and cultural contexts associated with Anglophone African literatures A sample of key theoretical debates in the field of

African studies at large (connected to additional theoretical fields such as postcolonialism, human rights, feminism,
ecocriticism, postmodernism, and so on)
A sample of key genres in African literature, include the memoir and autobiography, the novel, and drama Ways to compare, contrast and combine different theoretical and methodological positions in the field of African Studies.

Syllabus: This module will examine the literary representation of violence by authors writing across the African continent today. Specifically, our analyses of selected works and writers will explore the following themes: 1. how attempts toward the national catharsis of post-genocide Rwanda and post-apartheid South Africa have been unsuccessful in ridding the two
countries of cruelty and bloodshed; 2. how child soldiers come to terms with their violent and violated childhood while struggling to reinvent themselves in the midst of ruined societies; 3. how anti-colonial liberation warfare is remembered and informs contemporary identity struggles; and 4. how the memory of slavery informs the desire for rootedness and home. We will read novels, autobiographies, and hybrid texts, alongside watching films and reviewing key essays in the field of African literature.

EH4027 - CONTEMPORARY WOMEN'S WRITING

ECTS Credits: 6 (Year 4 Module)

School of English, Irish, and Communication

Limited capacity

Rationale and Purpose of the Module: To introduce students to key texts and themes in contemporary women¿s writing; to introduce students to critical methodologies for the analysis of gender in literary texts.

Syllabus: This course will introduce students to a number of key fictions by British and North American women authors, written between the 1970s and the present day. We will examine the ways in which these fictions respond to the changes in female experience in the second half of the twentieth and beginning of the twenty-first century, as well as exploring how these fictions reflect upon, and re-figure, conventional understandings of gender identity. Key issues for discussion will be the ways in which the texts respond to their social and cultural contexts, and how gender identity is shaped by location and place in these fictions. We will also explore the significant motifs that emerge across texts, such as women and madness; mother-daughter relationships; femininity and desire; fantasy and romance; the body; and the writing of race and gender.

EH4028 - STUDY OF A MAJOR IRISH AUTHOR

ECTS Credits: 6 (Year 4 Module)

Restriction: Open to English majors / Final year students only

Limited capacity

School of English, Irish, and Communication

Rationale and Purpose of the Module: This module offers students the opportunity to engage in intensive study of an author whose work has significantly affected the traditions of Irish literature when written in English. Students will read an extensive selection of the authors works in order to understand fully his/her individual development and his/her important contributions to literary history. On successful completion of this module, students will have gained An understanding of the author in his/her political, historical, and cultural contexts; Familiarity with a range of the authors works and with a range of his/her thematic, stylistic, aesthetic, and formal concerns; An understanding of the authors importance in the literary canon; An understanding of different theoretical and methodological ways of interpreting the major author.

Syllabus: This module will function as a critical survey of the work of a major Irish author. Students will study the authors development from early efforts to mature output and will analyse and discuss the authors overall impact on literary history. The module will position the author historically and politically, considering the authors role as a

contributor to intellectual history. By locating the author in different theoretical and methodological frameworks, students will have the opportunity to assess and interpret a wide range of the authors work. Example One - James Joyce
Addressing the production of Irish cultural and social identities in these texts, students will construct readings of Joyces work using contemporary literary and cultural theory. Focusing on the major fictions of Joyce, the module will also consider his prose and life-writing, and explore the interconnections between these various writings. Joyces literary experimentation provides an opportunity to explore narrative form and technique and so the module will consider the ways in which literary conventions and cultural discourses are challenged in his work. Given the range of new media available in this field as well as Joyces own commitment to film, we will explore a number of methods of reading Joyce from photographs, to archive footage, to the contemporary documentaries about and film productions of his work, to the Joyce hypertext and other online resources.

JM4008 - INVESTIGATIVE JOURNALISM
ECTS Credits: 6 (Year 4 Module)
School of English, Irish, and Communication

Rationale and Purpose of the Module: The Investigative Journalism module aims to give students an insight into how to conceive, research and write a piece of investigative journalism to professional standards.

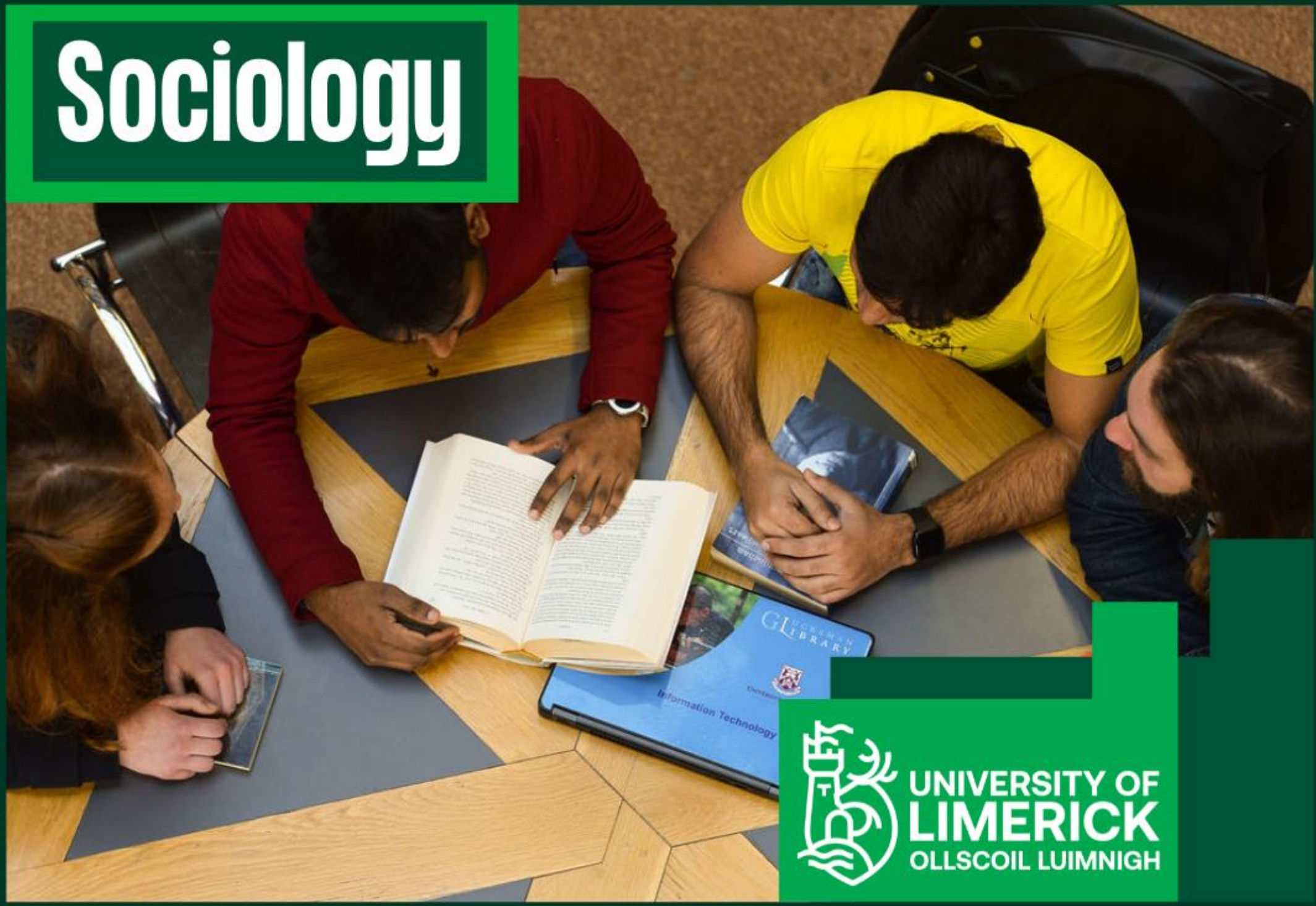
Syllabus: Students will originate an idea, and under the guidance of the tutor will develop it, research it using printed sources and the internet, compile a list of interview subjects and carry out at least two faces to face interviews. The research will end in a 2,000-word investigative news feature, with background fact boxes and other material if relevant. The feature must be aimed at a specific newspaper or magazine, and designed into a spread or spreads appropriate to the style of that publication. A research journal of at minimum of 1,500 words will set out the way the research was carried out, what difficulties were encountered, and will include contacts of the interviewees for checking. Assessment will be by the individual students' contributions to the final project.

JM4051 - TV AND DIGITAL BROADCASTING
ECTS Credits: 6 (Year 4 Module)
Limited capacity
School of English, Irish, and Communication

Rationale and Purpose of the Module: This module builds upon theoretical and practical audio-visual journalism concepts introduced on the BA Journalism and New Media degree program in year one, following recommendations by the external examiner and feedback from industry. It gives students a historical and theoretical perspective on the development of audio- visual journalism norms and culture and develops and adapts student skillsets towards content creation for multi-media digital platforms.

Syllabus: The module examines historical and organisational perspectives on visual news representation, while examining the medium's political and social impact, as well as recent technological developments in the field. Lectures examine the evolution of, uses and limitations of professional skills and normative values in the sector. The module has a strong practical component with instruction on scripting, shooting, editing, presentation, production and pitching and designing content for multi-media digital platforms. Lectures and labs are held in a dedicated newsroom and incorporate in-class practice-based components with problem-based learning elements. The module also includes interactions with industry figures, via talks and short workshops, as a means of showing how concepts discussed in lectures can be effectively applied in professional environments.

Sociology



UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Sociology Year 1 Modules

SO4001 - INTRODUCTION TO SOCIOLOGY
ECTS Credits: 6 (Year 1 Module)
Sociology

Rationale and Purpose of the Module: This module aims to introduce students to the subject matter of contemporary sociology. It will familiarize students with the key concepts used within sociological analysis and demonstrate, using illustrative materials, the uses and importance of sociological analysis in the modern and post-modern world.

Syllabus: An introduction to the sociological perspective What is sociology and what do sociologists do? The development of sociology the sociological imagination an introduction to sociological theory Agency and Structure Culture, Norms and Values An introduction to structural functionalist theories An introduction to conflict theories An introduction to interaction theories An introduction to feminist theory and post-modernism An introduction to sociological research, The ethics of social research.

Sociology Year 2 Modules

SO4073 - CLASSIC SOCIOLOGICAL THEORY
ECTS Credits: 6 (Year 2 Module)
Sociology

Rationale and Purpose of the Module: This module introduces students to classic social theory. Key work is reviewed, incorporating various perspectives from classic thinkers who continue to have an enduring influence on the sociological imagination. The module will consider some of the major works of: Marx, Durkheim, Weber, Simmel, Schutz and Mead.

Syllabus: The module begins by outlining the socio-historical transformations (industrialization, urbanization, expansion of capitalism) that gave rise to classic social theory. Key thinkers, who sought to make sense of modernity and `the problem of social reality¿, are then discussed, such as: Mark, Durkheim, Weber, Simmel, Mead and Schutz. Discussion will focus on their different analyses of, among other things: the development of capitalism and the money economy; the division of labor; social solidarity; class conflict and ideology; rationalization; religious life; the structures of the life- world; the dynamics of symbolic interactions and the self. The module considers analyses of historically unfolding macro-social structures, meso-social formations (e.g., bureaucratic organization) and the vicissitudes of everyday life. The import of classic social theory to the discipline of sociology - including its aims, scope and analyses of modernity ¿ is a theme that runs through the module.

SO4036- CONTEMPORARY SOCIOLOGICAL THEORY
ECTS Credits: 6 (Year 2 Module)
Sociology

Rationale and Purpose of the Module: a) Introduce students to a selection of modern and contemporary theories following on the classical tradition. b) Develop students' understanding of the discipline of sociology in the contemporary context, taking account of changing intellectual and social contexts. c) Demonstrate how these theories have been influenced by classical social theories in terms of how they - challenge key classical presuppositions about the nature and scope of sociology in understanding the social world; - their level of indebtedness to or departure from classical theoretical antecedents. d) Enable students to differentiate between different theoretical approaches in relation to key sociological concepts such as structure and agency, rationality and reflexivity, objectivism and subjectivism, micro-analysis and macro-analysis, realism and constructivism, modernity and postmodernity.

Syllabus: This module aims to broaden and deepen students engagement with and understanding of the development of sociology as a discipline following on

from their introduction to the sociological classics. It introduces students to a selection of modern and contemporary theories as a way of understanding how sociological theory has developed to reflect changing social and intellectual contexts. The course will identify the extent to which the selected theories build on key classical presuppositions or offer more radical departures in terms of the key analytical debates within sociology. As a way of elucidating these issues, substantive topics will be discussed in relation to the different theoretical perspectives. The range of theoretical perspectives will encompass the following: social constructionism (Berger and Luckmann); the sociology of the everyday (e.g. Goffman, Blumer); critical theory (e.g. Foucault, Habermas, Feminist Theory and theories of late/post-modernity; theories of rationality (Rational Choice/Rational Action theory); and the theory of social practice (Bourdieu).

SO4083 - INTRODUCTION TO ECONOMIC SOCIOLOGY

ECTS Credits: 6 (Year 2 Module)
Sociology

Rationale and Purpose of the Module: This module will introduce students to key writings and ideas on the sociology of economic life - encompassing domestic, state and market spheres of work. The purpose is to cover a range of classic texts and contemporary applications and theories within economic sociology. The module will focus on elaborating a core undercurrent in economic sociology, one which conceptualises, compares and analyses changes over time occurring at the macro, micro, and meso-level of society: changing social relations, changing market interactions, changes within households, changing valuations across economies, and structural change in society. Engaging a series of lectures, seminars and group dialogue the module aims to equip students with a thorough understanding of sociological explanations of socio-economic phenomena and the dynamic interplay between individual and institutional action in the 20th and 21st century.

Syllabus: Economic Sociology: An introduction Economic and Sociological theory: Connections and conflicts Making and shaping economies: Organization, institutions, states and policies Making and shaping economies: Labor, labor organization, and markets Making and shaping economies: Economic activities - the rational and the less than rational Economies, economics, and inequalities Economic organization: Socialist and post-socialist transformations Global economics

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Sociology Year 4 Modules

SO4037 - QUALITATIVE METHODS FOR SOCIOLOGICAL RESEARCH
ECTS Credits: 6 (Year 4 Module)
Sociology

Rationale and Purpose of the Module: The aim of the module is to provide students with an understanding of
the development of the field of qualitative research and to introduce students to the central methods and approaches that fall under the category of qualitative research. Furthermore, students will be provided with guidelines governing research that is grounded in the assumptions of qualitative methodology.

Syllabus: What is qualitative research? What are the different paradigms, which fall within the parameters of qualitative research? The history of qualitative research. Approaching research from a qualitative perspective, generating ideas, defining cases, analysis, and interpretation. Doing interviews and conducting observation studies.

SO4047 - SOCIOLOGY OF THE WELFARE STATE
ECTS Credits: 6 (Year 4 Module)
Sociology

Rationale and Purpose of the Module: The key focus and aim of the module is to provide students with an understanding of the welfare state. Students will be familiarized with debates, definitions and theoretical frameworks pertaining to the concept of the welfare state, the different models of welfare in existence, and the need for a rigorous analysis of the welfare state. In addition to enhancing student's awareness and understanding of key sociological theories, concepts and issues, this module is oriented to developing students. ability to use sociology as an analytical tool. It is hoped that students will consider the issues covered in the module as case studies through which they can develop their understanding of the techniques of sociological analysis, which may then be applied to other contexts.

Syllabus: This module aims to provide students with an understanding of the welfare state. Students will be familiarized with debates, definitions and theoretical frameworks pertaining to the concept of the welfare state, the different models of welfare in existence, and the need for a rigorous analysis of the welfare state. The module examines the development of welfare provision and the different models of welfare throughout Europe & in the USA. Specifically, the module will focus on the Irish context as it seeks to examine the structural, cultural, and ideological dynamics underpinning the Irish model of welfare provision. We will engage with current and established sociological theories and debates as a means of interpreting and understanding the implications these issues have for the distribution of power, the concept of and the operation of citizenship, processes of social exclusion, the role of social policy, and public discourse.

SO4057 - SOCIOLOGY OF HEALTH AND ILLNESS

ECTS Credits: 6 (Year 4 Module)

Sociology

Rationale and Purpose of the Module: The aim of this course is to introduce students to the important sub-disciplinary field of the sociology of health and illness. The overall objective is to develop the students' analytical ability to examine the concepts of health and illness from a sociological perspective (perspectives), and critique the structures and processes involved in these within late modern Western society.

Syllabus: THEME I: NEW SOCIO-CULTURAL DIMENSIONS, The sociology of the body/embodiment, the sociology of risk. THEME II: SCIENCE, TECHNOLOGY & MEDICINE, Theorizing the relationship between science, technology and medicine, Human Genetics and the redefinition of disease, Reproductive genetics, predictive testing and the construction of risk, New reproductive technologies: assisted reproduction and infertility. THEME III: SOCIAL PERSPECTIVES ON MENTAL HEALTH & ILLNESS, The social construction of mental illness, social models of mental health & illness, Therapeutic and social meanings of the recovery concept. THEME IV: THE MEANINGS AND EXPERIENCES OF HEALTH, ILLNESS & DEATH, the social construction of health, illness & disease, the experience of chronic illness, illness related stigma, Death and dying. THEME V: SOCIAL STRUCTURE AND HEALTH, Social Class and health, Gender and health, Ethnicity, and health. THEME VI: MEDICINE, POWER AND AUTONOMY, The professional dominance of medicine in healthcare, Inter-professional relationships: power, knowledge, and jurisdiction. Alternative and complementary medicine.

SO4067 - SOCIOLOGY OF WORK

ECTS Credits: 6 (Year 4 Module)

Sociology

Rationale and Purpose of the Module: The course will introduce theories of social change and perspectives on work as well as examining contemporary changes in work practice. The effects of class, gender, and ethnicity on access to and experience of work will be examined. The changing organizational context of work will be explored. Other themes include sectoral decline, development, and relocation as well as of globalization and the rise of the transnational corporation. The continuance of

hierarchical and vertical segregation during organizational, societal and cultural change will be explored, as well as organizational culture. Several Irish case studies will be examined e.g., those related to the semi-state and educational sectors. The course concludes with a consideration of the future direction of socioeconomic change and its impact on the distribution, structuring and experience of work.

SO4052 - SOCIOLOGY OF RACE AND RACISMS
ECTS Credits: 6 (Year 4 Module)
Sociology

Rationale and Purpose of the Module: This module will consider 'race' as a social construct and address some of the following questions. How and why is race constructed in contemporary society? How do 'racialising processes' occur in social relations? How does 'racial formation' take place in conjunction with other identities? How are racial identities contested? What are the gendered and class-based dimensions of race? These questions will be addressed by looking at how racial knowledge and forms of institutional racism inform public policy specifically in education, in housing, within the criminal justice system and in health. The purposes of the module are to a) discuss and analyse the conceptual frameworks for understanding the multifaceted and intersectional dimensions of race and racism; and b) to comparatively examine how these inform public policy in Ireland and internationally.

Syllabus: The social construction of race, Privilege and whiteness, Culture and nationalism, Institutional racism, Racism and education, Racism and housing, Racism and the Criminal Justice System, Racism and health, Intersectionality in policy

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Irish World Academy of Music & Dance

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Irish World Academy Year 1 Modules

MD4091- Irish World Academy Practicum C1
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module focuses on students developing their artistic practice in a collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialties. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context, and modes of embodiment. The title of the module reflects the Irish World Academy tradition of presenting modules with wide performance skills focus as 'practicum'. Such an approach is enabled by an embodied methodology that is critically engaged. The 'C' of the title reflects the cross-genre content of the module.

Syllabus: This module is split into two parts. In the first the student will engage other students in a laboratory pace within their own discipline, mentored by faculty and tutors, to develop creative, collaborative work within and extending from their own disciplines and genre practices. The second half of this module is designed to facilitate 'cross-arts' exploration of creative practice as a core dimension of every Academy undergraduate's educational experience at the Irish Academy. Each student will choose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental / dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and other available performing arts practices.

MD4121 - INTRODUCTION TO VERTICAL DANCE AND WALL RUNNING
ECTS Credits: 6 (Year 1-4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: The aim of this module is to introduce students to this core aspect of aerial dance. This module forms part of a suite of aerial modules designed to create an aerial dance strand within the MA Festive Arts programme. This responds to the demand for third level training in the field, combined with the management and research elements of the MA Festive Arts programme. The class combines the use of sit-harness and abseil equipment both against a wall and free-flying. The class begins with basic kit familiarization and core stability, strengthening and preparation. It then progresses to basic orientation on different planes, building towards a more dynamic vocabulary. Students will also be taught repertoire from established company performances, as well as allowing student time for creative input.

Syllabus: The class combines the use of sit-harness and abseil equipment both against a wall and free-flying. The class begins with basic kit familiarization and core stability, strengthening and preparation. It then progresses to basic orientation on different planes, building towards a more dynamic vocabulary. Students will also be taught repertoire from established company performances, as well as allowing student time for creative input.

MD4131 - HIP-HOP-DANCE ELECTIVE 1
ECTS Credits: 6 (Year 1-4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: To provide students with the opportunity to become competent in hip hop dance so that they can develop the skills and confidence to work towards the creation of Hip-Hop compositions in a range of performance contexts, which will broaden their career options in Dance.

Syllabus: Over this elective, students will learn, in studio, the roots of Hip-Hop and its evolution from the streets of New York city in the 1970s. Emphasis will be placed on learning about roots of Hip-Hop through class participation and learning the choreography of these dances and origins. By utilizing contemporary chorographic techniques, dancers will create new works for performance.

MD4141 - IRISH DANCE PERFORMANCE SKILLS

ECTS Credits: 6 (Year 1-4 Module)

(Lab-Based Module)

Limited Spaces Available: 10

(Students must pass an audition)

Humanities

Rationale and Purpose of the Module: This elective will be offered to musicians and dancers whose performance practice is outside of the Irish dance tradition. It will add to their performance skill set and increase their versatility and dance competence. It also reflects the strengths of Academy faculty.

Syllabus: Development of good basics in Irish dance technique. Students will continue to develop basic Irish dance steps and movement patterns. Music /dance connection will also be explored. The following tune types will be among those used to teach Irish dance rhythm: Reel, jig, hornpipe, waltz and polka. Posture, turnout, and footwork will be emphasized to give students a basic dance vocabulary which they can draw on. They will learn motifs suitable for soft shoe and more rhythmic hard shoe dancing.

MD4142 - IRISH DANCE PERFORMANCE SKILLS 2

ECTS Credits: 6 (Year 1-4 Module)

(Lab-Based Module)

Limited Spaces Available: 10

(Students must pass an audition)

Humanities

Rationale and Purpose of the Module: To enable students whose first area of practice is not Irish dance to continue to develop their Irish dance skill set.

Syllabus: Continued development of Irish dance skills to include travel steps, foot work, rhythm and an understanding of interpreting the music. Basic posture, footwork and musicality will be addressed relevant to the students' ability.

MU4001 - CRITICAL ENCOUNTERS WITH IRISH MUSIC AND DANCE

ECTS Credits: 6 (Year 1 Module)

Humanities

Rationale and Purpose of the Module: This module is an introduction to the growing field of traditional music and dance studies and will give the student an overview of some of the important features of these traditions as well as current areas and modes of research in this context. The investigations presented in these modules will be particularly informed by the international disciplines of Arts practice research, ethnomusicology and ethnochoreology. Students here will also be introduced to responsible and accountable academic and research practices.

Syllabus: Issues addressed in this module will be taken from current research engagements with the native Irish music and dance traditions. These will critically engage historical narratives, conceptual structuring and evolving identities of the traditions in question. A particular Arts practice lens will be engaged so students can experience the aesthetic and structure of the tradition per formatively. Students will be developed writing and presentation skills associated with such academic engagement

and be introduced to concepts of research as a creative, scholarly practice.

MU4011 - CRITICAL ENCOUNTERS WITH WORLD MUSIC AND DANCE

ECTS Credits: 6 (Year 1 Module)

Humanities

Rationale and Purpose of the Module: This module is an introduction to the growing field of world music and dance studies and will introduce the student to a critical engagement with the category and how it is imagined in a number of cultural contexts as well as current areas and modes of research. Students will be exposed to a selection of world music practices in an academic and performative context, providing them with an insight into some of the diversity of music and dance practices on this planet. The investigations presented in this module will be particularly informed by the international disciplines of Arts practice research, ethnomusicology and ethnochoreology. Students here will also be introduced to responsible and accountable academic and research practices.

Syllabus: Issues addressed in this module will be taken from current research engagements with the concept of world music and dance and will examine a selection of diverse practices that are seen to constitute and sometimes challenge this category. These will critically engage historical narratives, conceptual structuring and evolving identities of the concepts and traditions in question. A particular Arts practice lens will be engaged so students can experience the aesthetic and
structure of the tradition per formatively. Students will be developed writing and presentation skills associated with such academic engagement and be introduced to concepts of research as a creative, scholarly practice.

MU4021 - INTRODUCTION TO SONGWRITING

ECTS Credits: 6 (Year 1-4 Module)

(Lab-Based Module)

Limited Spaces Available: 10

(Students must pass an audition)

Humanities

Rationale and Purpose of the Module: The purpose of this module is to introduce students to the relevant skills and basic creative processes entailed in songwriting. By creating new work in a collaborative environment, students will develop as reflective artists and composers, engaging in meaningful self and peer-to-peer critique.

Syllabus: Through weekly workshops, students will experiment with different methods of developing original songs, considering simple elements of melody, lyrics and structure of song. Through weekly lectures and engagement with post-graduate students of MA Songwriting, students will be exposed to a range of different songwriters of varying genres and styles. They will be encouraged to locate their own creative practice within the wider experience of songwriting, engaging in reflective practice through group discussion, and individual journaling and self- evaluation.

MU4053 - MUSIC COMPOSITION 1

ECTS Credits: 6 (Year 1-4 Module)

(Lab-Based Module)

Limited Spaces Available: 10

(Students must pass an audition)

Humanities

Rationale and Purpose of the Module: Music Composition 1 introduces students to a range of contemporary acoustic and electronic music composition practices, with the aim of developing each student's individual composition practice. Composition practices from within and outside of oral traditions, both score-based and non-score-based, are explored.

Syllabus: Students engage with a range of approaches to music composition, broadening their experience of diverse compositional concepts, methods and techniques, towards the development of their own, distinctive creative practice.

MU4083 - SECOND INSTRUMENT STUDIES

THREE
ECTS Credits: 6 (Year 1-4 Module)
(Lab-Based Module)
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module allows students on the BA Irish Music / BA Irish Dance / BA World Music / BA Contemporary Dance / BA Voice to further develop performance skills in a instrumental skill (including voice) secondary to their main performance practice at the Irish World Academy. Students will have the opportunity to critically engage embodied expressions of performance practice on an instrument and or practice other than that in their core Practicum A module. Students will engage these studies in a environment informed by recent principles in arts practice research. This module will give students invaluable new perspectives on their creative and artistic potential. This is an elective module to be offered throughout the BA Irish Music / BA Irish Dance / BA World Music / BA Contemporary Dance / BA Voice and is subject to the Irish World Academy being able to source appropriate expertise and resources.

Syllabus: Students in this module will continue to develop a second instrumental performance area in small group and one-on-one contexts. Students will develop and document an appropriate practice regime as well as use reflective tools such as auto-ethnographic journals. Students will generate a short public performance which will play a part in the assessment of this module. Prerequisites: MU4017

MU4093 - AERIAL DANCE 1
ECTS Credits: 6 (Year 1-4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: The module provides a pedagogical context for the development of the students' skills and knowledge to explore the use of apparatus within aerial dance. Engaging in a variety of techniques on the individual apparatus including Trapeze, Hoop, Fabric, Cocoon, and Rope, the student will explore the difference in gravity and weightlessness which will allow them to experience and consider new physical possibilities that are unique to this next level of performance complexity.

Syllabus: Students will consolidate and develop further skills covered in the previous module MD4121 (health and safety fundamentals, apparatus techniques, and aerial physical body strategies) to continue to provide an opportunity to cultivate technical competence. Once comfortable on a chosen apparatus the student will be encouraged to explore ways of developing movement phrases. During the development of this short choreographic exploration the students will have an opportunity to engage with technical and creative input from practicing artists within the field of Aerial Dance.

MU4135 - IRISH TRADITIONAL MUSIC 1
ECTS Credits: 6 (Year 1-4 Module)
Humanities

Rationale and Purpose of the Module: This module is an introduction to the growing field of traditional music and dance studies and will give the student an overview of some of the important features of these traditions.

Syllabus: Issues addressed in this module will be dance tune types and structure, English language song tradition, instrumentation, traditional music, and dance in America in the first half of the twentieth century, the harp tradition to 1800, modern step dancing, ceili dancing.

Irish World Academy Year 2 Modules

MD4081 - Irish Music and Dance Studies
ECTS Credits: 6 (Year 2 Module)
Humanities

Rationale and Purpose of the Module: The purpose of this module is to engage issues more deeply in Irish traditional music and dance studies and, in this context, to apply cultural theory to Irish music and dance Studies in a deeper and more creative way. These issues will be in the interactive contexts of Irish traditional music, song and dance, interrogating themes of difference and identity as relevant to traditional musicians in the past and present.

Syllabus: Specific issues will be focused on in the areas of Irish and English Language Song; the multitude of Irish dance styles as well as instrumental practice. These are to be addressed using a thematic approach which will engage theoretical areas such as identity, ethnicity, globalization and the meaning of tradition. As such this is a research led module and themes and approaches will be developed by the course leader in association with fellow faculty.

MD4092 - Irish World Academy Practicum C3
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module will continue to focus on students developing their artistic practice in a collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialties. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context, and modes of embodiment. Students will have the option to build on cross-genre skills acquired in Practicum C1 in certain contexts. The title of the module reflects the Irish World Academy tradition of presenting modules with wide performance skills focus as 'practicum'. Such an approach is enabled by an embodied methodology that is critically engaged. The 'C' of the title reflects the cross-genre content of the module.

Syllabus: This module is split into two parts. In the first the student will engage other students in a laboratory space within their own discipline, mentored by faculty and tutors, to develop creative, collaborative work within and extending from their own disciplines and genre practices. The second half of this module is designed to facilitate 'cross-arts' exploration of creative practice as a core dimension of every Academy undergraduate's educational experience. Each student will choose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental / dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and other available performing arts practices. Students will have the option to build on cross-genre skills acquired in Practicum C1 and/or C2 in certain contexts.

MD4104 - MUSIC THEORY AND PRACTICE SKILLS 1
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This is an elective module intended for undergraduate students with dance as a first area who wish to have more instruction in music theory, ear and notation practice and keyboard skills to further develop skills introduced to the student from first semester of first year, increasing his/her employability as a music teacher.

Syllabus: Piano skills including sight-reading, accompaniment technique, basic arrangements, right hand ornamentation; music theory and practice, including dictation (melodic, rhythmic, and harmonic) understanding modes and scales and their operations in Western harmony and in Irish

contexts; tune composition; basic modulation and chordal accompaniment; music analysis.
Prerequisites: MD4001, MD4002, MD4003

MD4113 - PERFORMING ARTS TECHNOLOGY
ECTS Credits: 6 (Year 2 Module)
Humanities

Rationale and Purpose of the Module: This module will introduce students to professional audio and visual technologies relevant to
performers in their field. The professional world around performance practice, performance education, media and other career paths open to students on this programme will be explored. Students will use such technologies in professional contexts generating project work out of the day-to-day life of the Academy, recording concerts, providing technical support to a wide range of performances, and generating media appropriate to the world of performing arts.

Syllabus: Students in this module will learn practical technological applications relevant to their performance practice. Students will learn to use and manipulate PAs and lighting rigs, led by professionals in the field and applied in real-world situations. Students will also be introduced to media generating software such as Final-Cut Pro and Logic to produce high level audio and video outputs.

MD4123 - DANCE STUDIES 1
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module will introduce students to the history of modern dance, from its roots in the classical forms of the eighteenth and nineteenth centuries as well as popular forms of the twentieth. Students will be encouraged to see such development in a wider aesthetic, social and cultural context. Embracing the principles of arts practice, students will be given the opportunity to engage contemporary approaches to modern dance.

Syllabus: This module aims to develop knowledge of social and historical influences in the development of modern dance over the past 300 years and to develop understanding of anatomy in relation to the dancing body. The module also aims to raise awareness of the social construction of dance knowledge, dance practices and their historical contexts and a critical approach to source material. The focus of the course will be on Romanticism, Classicism, Neo-Classicism, Modernism, Post-Modernism and the twentieth century history of Irish theatre dance. The module will develop students' independent research, library research/source location skills and critical thinking.

MU4023 - VOICE STUDIES: HISTORICAL AND CROSS CULTURAL PERSPECTIVES
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module is an introduction to the field of voice studies and will provide the student with historical and cross-cultural perspectives on singing and voice training. Informed by a transdisciplinary understanding of singing across music cultures, the student will engage with important sources and current research in areas of vocal pedagogy, ethnomusicology, and arts practice research.

Syllabus: This module will offer a critical engagement with historical, contemporary, and cross-cultural perspectives on singing and voice training, introducing the student to contextual theories and ideologies related to their primary field of practical study.

MU4033 - WORLD MUSIC & DANCE SURVEY 1
ECTS Credits: 6 (Year 2 Module)
Humanities

Rationale and Purpose of the Module: This module will introduce students to aspects of sound and movement from around the world, questioning the nature of what is 'World Music and Dance' in the 21st century digital age.

Syllabus: This module will examine a selection of music and dance expressions from diverse places round the globe. Students will study the music and dance in the context of 'world music' with a specific focus on India, England, Scandinavia, West Africa, Scotland,
Brittany, Galicia, North America and Indonesia. This module will be assessed through coursework and exam.

MU4063 - SELF-DIRECTED PROJECT
ECTS Credits: 6 (Year 2-4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module provides students with the opportunity to devise and deliver a small-scale Performing Arts-related project. Students engage in independent learning, choosing learning objectives and outcomes that are based on their personal interests, strengths and learning goals. The active nature of this self-directed learning optimizes their educational experience.

Syllabus: In consultation with a mentor/teacher, the student devises and implements a Performing Arts-based project that may have one or more of the following outcomes: an academic paper, a performance, or a portfolio of compositions (presented in various formats).

MU4073 - CROSS-ARTS ENSEMBLE 1
ECTS Credits: 6 (Year 2-4 Module)
(Lab-Based Module)
Limited Spaces Available: 5
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: The Cross-Arts Ensemble introduces students to cross-arts practices, with the aim of developing their skills in interdisciplinary, collaborative creative practices. The Cross-Arts Ensemble supports engagement between dancers and musicians working together to devise and realize new artistic work.

Syllabus: The Cross-Arts Ensemble module introduces students to collaborative, cross-arts practices. Under the mentorship of music and dance faculty members, students' study interdisciplinary, collaborative artistic practices and strategies, and engage in co-creation and presentation of artistic works.

MD4087 - ADVANCED ENSEMBLE
ECTS Credits: 6 (Year 2-4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This is a module for fourth year BA Irish Music and Dance Students who wish to develop their ensemble skills further and who show a propensity to do so in their assessment for module MD4016.

Syllabus: Students in this module will concentrate on developing their knowledge of ensemble skills taken from a number of musical contexts. These skills will be developed in the context of their own performance practices. Students will attend several lectures that engage a systematic examination of the musical processes involved in the creation of ensemble. Such processes will then be utilized in performance laboratory classes, which will result in a public performance, developed in the context of a reflective journal.

MD4108 - CHOREOGRAPHIC SKILLS 1
ECTS Credits: 6 (Year 2-4 Module)

(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This is an elective module intended for undergraduate students with dance as a first area who wish to further develop and deepen their choreography and notation skills.

Syllabus: This module has two elements creating and documenting solo and /or duet dance works. Students in this module will concentrate on further developing their choreographic abilities drawing on choreographic tools and techniques from a multitude of dance genres and contexts. The students will create and perform new solo and/or duet works. They will also be taught a variety of skills to assist with the development of strategies
to record and document their creative processes. Several notation systems including Labanotation, Newcastle notation, a variety of journal reflections as well as video and audio recordings will all inform the choreographic practice.

MU4017 - SECOND INSTRUMENT STUDIES ONE
ECTS Credits: 6 (Year 2-4 Module)
(Lab-Based Module)
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module allows students on the BA Performing Arts to develop performance skills in a second instrument. Students will have the opportunity to critically engage embodied expressions of performance practice on an instrument and or practice other than that in their core Practicum A module. Students will engage these studies in a environment informed by recent principles in arts practice research. This module will give students invaluable new perspectives on their creative and artistic potential. This is an elective module to be offered throughout the BA in Performing Arts programme and is subject to the Irish World Academy being able to source appropriate expertise and resources.

Syllabus: Students in this module will develop a second instrumental performance area in small group and one-on-one contexts. No previous experience of the adopted instrumental practice is necessary. Students will develop and document an appropriate practice regime as well as use reflective tools such as auto-ethnographic journals.

MU4106 - ARTS AND HEALTH
ECTS Credits: 6 (Year 2-4 Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module:
This module is designed to enable music and dance students to develop awareness and understanding of the impact of the arts on health and well-being. The module aims to develop well-rounded music and dance graduates who are aware of the role of the arts in various contexts (such as hospital, community healthcare and mental health) and the impact of their own health and well-being on their own arts performance. The role of arts in society will be examined as well as the wide variety of approaches to creative engagement and the value of art.
Syllabus:
In this module students will develop their knowledge of the interaction of arts, health and well-being. Students will discuss, describe and critically reflect on the ways theorists and researchers have considered social, psychological, physical and behavioural aspects of the arts and to discuss the role of the arts in society and the value of art. By the end of the module students will be able to describe aspects of physiological responses to music; the social and cultural context of music and dance; the importance of listening skills, arts and health practice.

Irish World Academy Year 3 Modules

MD4046 - IMPROVISATION AND COMPOSITION (VOICE / MUSIC / DANCE)
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module will introduce students to creative processes, using improvisational and compositional exercises. Students will investigate the use of movement, instrumental and vocal concepts as motives for creative practice.

Syllabus: Students taking this module will engage a number of different improvisatory and compositional practices from western and 'world' music and dance traditions as well as their own genres. They will understand these practices in context but also engage them in the context of their own performance practices. Students will develop performances that will be produced from an engagement and development of these practices in a meaningful and creative manner. Students will be provided with written feedback according to BA Irish Music and Dance policy.

Irish World Academy Year 4 Modules

MD4147 - IRISH WORLD ACADEMY PRACTICUM C6
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Limited Spaces Available: 10
(Students must pass an audition)
Humanities

Rationale and Purpose of the Module: This module will continue to focus on students developing their artistic practice in a collaborative context while gaining embodied experience of other arts practices outside of their own genre and disciplinary specialties. The rationale for including a defined space for the engagement with performance practices unfamiliar to the student is to show the student different creativities structured by unfamiliar aesthetics, cultural context, and modes of embodiment. Students will have the option to build on cross-genre skills acquired in Practicum C1 in certain contexts. The title of the module reflects the Irish World Academy tradition of presenting modules with wide performance skills focus as 'practicum'. Such an approach is enabled by an embodied methodology that is critically engaged. The 'C' of the title reflects the cross-genre content of the module.

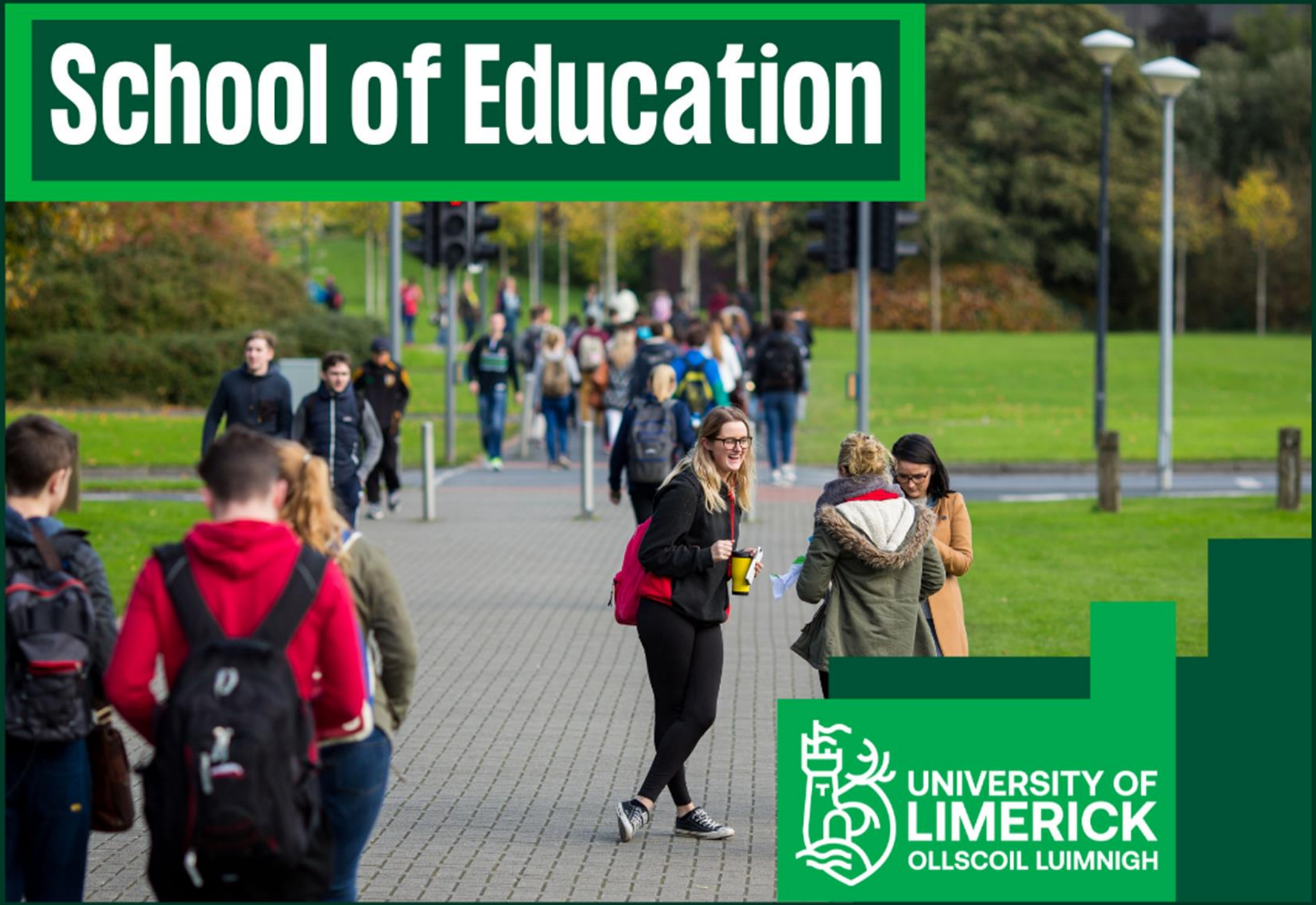
Syllabus: This module is split into two parts. In the first the student will engage other students in a laboratory space within their own discipline, mentored by faculty and tutors, to develop creative, collaborative work within and extending from their own disciplines and genre practices. The second half of this module allows for the facilitation of 'cross-arts' exploration of creative practice as a core dimension of every Academy undergraduate's educational experience. Each student will choose a performance course, from a genre or approach outside of their disciplinary and genre focused stream, selecting from a pool of courses covering instrumental / dance tuition, music/dance ensemble, dance/music ensemble, dance/music composition and other available performing arts practices. Students will have the option to build on cross-genre skills acquired it Practicum C1, C2, C3, C4 and/or C5 in certain contexts.

MU4007 - PROFESSIONAL SKILLS FOR THE PERFORMING ARTIST
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Humanities

Rationale and Purpose of the Module: This module will focus on the development of knowledge and skills necessary for professional engagement with the modern world of performance and related vocational fields.

Syllabus: This module will examine issues pertinent to the lives of professional musicians and dancers. Issues such as promotion, effective communication, industry structures, touring, dealing with statutory arts bodies.

School of Education



UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Faculty of Education & Health Sciences

School of Education Year 1 Modules

EN4051 - CONTEMPORARY UNDERSTANDINGS ON EDUCATION: PHILOSOPHICAL PERSPECTIVES

ECTS Credits: 6 (Year 1 Module)

Limited places available: 12

School of Education

Rationale and Purpose of the Module: During this module students will be exposed to some of the major contemporary thinkers in education. They will be encouraged to critically analyse these through the lens of deconstruction of their own very recent experiences of schooling. It is intended that the module will foster amongst students an appreciation of the interplay between educational theory and practice. Through induction into the scholarship of education, the module will aim to foster an understanding of teacher identity through critical engagement with the nature and purpose of education. The module will invite the students to outline their developing philosophy of education. The philosophy of education assignment will contribute to the portfolio.

Syllabus: Examining the theory-practice debate in education (Anderson & DeFalco); Appraising the significance of the experiential for teaching and learning (Greene and Dewey); Examining the significance of creativity and imagination when it comes to the project of educating (Ayers, Dewey, Greene & Robinson); Assessing the connection between democracy and schooling (Dewey, Greene and Freire), Illich (de-schooling society), Sugrue (deconstructing lay theories of teaching); Articulate in writing personal developing philosophies of education.

MB4001 - ALGEBRA 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 3

School of Education

Rationale and Purpose of the Module: To promote understanding of the number systems and their properties. To develop an understanding of the fundamental concepts of Linear Algebra. To promote proficiency in selected techniques and applications.

Syllabus: Number: basic number concepts, laws, equations; Number systems: extensions from N to Z, Z to Q and Q to R, complex numbers C; Elementary number theory: Peano's axioms, mathematical induction, binomial coefficients, fundamental theorem of arithmetic; Equations: linear, quadratic, polynomial equations, solution by graphical and numerical methods; Matrices: matrix algebra, applications.

School of Education Year 4 Modules

School of Education Year 4 Modules

MB4017 - GEOMETRY

ECTS Credits: 6 (Year 4 Module)

Limited places available: 3

School of Education

Rationale and Purpose of the Module: Recent changes to the Teaching Council requirements means that every teacher on entry to the profession of teaching must study at least 5 credits of Geometry, either Euclidean or non-Euclidean. At present, no such module is available in the University of Limerick and so it is critical that we provide this option for students so that they can complete their entire undergraduate, pre - service mathematics programme in - house. Geometry is a

core part of mathematics education and provides the basis for an introduction to rigorous mathematical reasoning. The study of geometry allows for student improvement in the area of logic, deductive reasoning and problem solving - all of which are skills that will benefit students in a range of other mathematical strands. Geometry is unlike pure mathematics modules in the sense that it has a wide range of practical applications. It is used, for example, in art, engineering, sport, construction, architecture, to name but a few. The literal translation of the word Geometry ("Earth Measure") serves to further highlight its applicability and this module will seek to highlight the relevance of the subject to all students undertaking it. As such, this module will share with students key mathematical concepts that underpin a lot of objects they see and use on a daily basis. Finally, Geometry and Trigonometry now makes up one - fifth of the junior and senior cycle mathematics curricula which the majority of students who study this module will end up teaching. As such, it is critical that they are equipped with the skills needed to teach this topic for understanding. IN order to do this they themselves need a solid grounding in the subject and need to understand the rationale behind the theorems and constructions that they will encounter in the mathematics classroom. This module seeks to provide them with this knowledge.

Syllabus: The syllabus will be broke up into 8 sections/chapter. These 8 sections are: Pythagoras Congruences and Similarity Circles and Angles Trigonometry Co-ordinates Vectors and Symmetry Spherical Trigonometry Non Euclidean Geometry
Prerequisites: MS4131

MB4008 - GROUPS AND ALGEBRAIC STRUCTURES

ECTS Credits: 6 (Year 4 Module)

Limited places available: 2

School of Education

Rationale and Purpose of the Module: To develop a broad understanding of algebraic structures especially group structure. To study realizations of group structure in geometry. To study selected applications in Science and Engineering.

Syllabus: Sets and operations: review of sets, operations; Groupoids and semi-groups: equality, commutativity, associativity, inverses, order; Groups: axioms, properties, sub-groups, cyclic groups, p-groups, permutation groups; Lagrange's theorem: applications to number theory, kernel, isomorphisms, normal subgroups, quotient groups; Sylow's theorems; Group of isometries; group of transformations, enlargements; Group of similarities; Rings: definition; integral domain, fields. Prerequisites: MB4001 , MB4002

Physical Education & Sports Sciences

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Physical Education & Sport Sciences Year 1 Modules

SS4411 - COACHING SCIENCE AND PERFORMANCE 1

ECTS Credits: 3 (Year 1 Module)

Limited places available: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To give students a basic proficiency, understanding and appreciation of rules, principles, tactics and demands of a selected sport. To introduce students to basic coaching skills and current issues.

Syllabus: Sports: Students will learn about and through a selective individual/dual sport. In addition to sport specific content (skills and tactics), common elements of coaching and applied physical conditioning will be included.

Pedagogy: Criteria for effective coaching, philosophy and role of the coach, coaching styles, communication, group organisation and management, demonstrations, safety and ethics in sport.

SS4321 - FUNCTIONAL ANATOMY

ECTS Credits: 3 (Year 1 Module)

Limited places available: 3

Note: Module runs from weeks 7 - 12

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This Module advances the student's understanding of anatomical structures involved in human movement, as well as providing an understanding of their mechanics in the production of functional and sporting activities. To consolidate students' understanding human biology by more advanced functional anatomy. Apply an understanding of human anatomy to the measurement and assessment of movement.

Syllabus: Skeletal system, Articular system, Musculo system, Neuromuscular system: CNS, PNS, axons, propogation, synapses, proprioceptors, exercise effects. Shoulder. Elbow & radioulnar. Wrist & hand. Hip & upper leg. Knee. Trunk & vertebrae. Pelvis. Foot & ankle. Range of motion. Posture.

SS4231 - HUMAN PHYSIOLOGICAL SYSTEM FOR SPORT AND EXERCISE SCIENCES

ECTS Credits: 3 (Year 1 Module)

Limited places available: 4

Note: Module runs from weeks 8 - 12

Physical Education & Sport Sciences

Rationale and Purpose of the Module: A thorough understanding of how the human body functions underpins all subject areas in the study of Sport, Exercise Sciences. Physiology deals with the coordinated activities of cells, tissues, organs and systems. In this module students are introduced to the basics of several human physiological systems and the integration of these systems to maintain homeostasis.

Syllabus: This module will cover material on the function of several human physiological systems including the nervous, urinary, endcrine, immune and digestive systems.

SS4021 - LIFESTYLE, FITNESS AND WELLNESS 1

ECTS Credits: 3 (Year 1 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide the student with the concepts and knowledge of a healthy lifestyle and the domains of wellness. The module will take students through lifestyle related diseases and strategies that can be used to help prevent these diseases and encourage exercise adherence and healthier lifestyles. Practical guidelines for exercise programming for individuals with special circumstances and conditions are also covered.

Syllabus: Healthy lifestyle factors; wellness concepts; exercise for health/fitness; cardiovascular

disease; risk factors for coronary heart disease; exercise adherence and motivation; stress management; back care; guidelines for exercise during pregnancy and post partum; exercise guidelines for the older adult; osteoporosis; exercise & diabetes; exercise & asthma: body composition & weight management: healthy eating guidelines; eating disorders

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SS4031 - HEALTH RELATED PHYSICAL FITNESS ASSESSMENT PROGRAMME DESIGN

ECTS Credits: 6 (Year 1 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide students with the knowledge and competencies to administer a series of fitness assessments appropriate to the exercise needs and goals of the general population and identified special groups. Following the assessments the student will be able to evaluate the outcomes and design a safe and effective individualised exercise programmes to meet the requirements of individuals with a variety of needs and goals.

Syllabus: Health related fitness components; screening procedures & guidelines for referral; field tests in the assessment of the health related fitness components; basic postural analysis; principles of training; exercise programming and prescription; monitoring, adapting and progressing programmes; case studies.

SS4011 - INTRODUCTION TO HUMAN MOVEMENT STUDIES (KINESIOLOGY) 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide students with a comprehension of the structures and functions of the human body and how they are effected by human movement. The module will also take students through the physiology of human performance including energy metabolism, the mechanics of human locomotion and the physiological responses to exercise

Syllabus: Structures and functions of the human body; effects of movement; skeletal system; muscular system; ideal alignment and posture conditions; the cardio-respiratory system and the effects of exercise; energy systems and their effects on programming;biomechanics of movement; high risk exercises; and the chronic and acute effects of exercise on the human body.

PY4091 – Competitive Team & Individual Game-Based Activities

ECTS Credits: 6 (Year 1 Module)

Limited places available: 5

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The rationale of this module is to allow students to become familiar with a selection of competitive team and individual game-based activities, ones in which skills and tactics are easily identifiable and practiced. The purpose of this module is threefold: 1) To introduce student teachers to the range of curricular models available to them designed to engage their students in the content areas of sport and physical activity (TC Subj Req). 2) To help student teachers develop a theoretical and practical knowledge of competitive team and individual game-based activities through the application of subject specific pedagogical principles and a variety of teaching methods (Céim). 3) For student teachers to be able to explain the appropriate skills, tactical approaches, and safety considerations necessary when engaging in competitive team and individual game-based activities, appropriate for all abilities, within a post-primary setting (Céim/JCWG /SCPE/LCPE).

Syllabus: This module is designed to provide students with an introduction to two specific elements; 1.) the curricular modules available to teachers within the area of physical education, and 2.) competitive team and individual game-based

activities through one of these curricular models. The course will focus on both the content and subject specific pedagogical principles one should consider when teaching this curricular area. Using the Teaching Games for Understanding (TGfU) curriculum model as framework, students will be able to identify and understand how various competitive team and individual game-based activities relate to each other in order to facilitate a well-rounded physical education programme.

PY4111 - FOUNDATIONS OF MOVEMENT: MOTOR LEARNING IN PHYSICAL EDUCATION

ECTS Credits: 3 (Year 1 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Developing a foundation of motor competence facilitates successful engagement in physical education, sport and physical activity across the lifespan. While research has extensively documented Irish children's failure to develop basic motor competence unaided, it has also identified how practitioners may address this shortcoming. This module will introduce students to core principles of motor learning and motor development so that they value developing motor competence in children and young people, and so that they are equipped with the knowledge and skillset to evaluate and develop basic motor competence within the physical education setting.

Syllabus: Defining motor development; a lifespan perspective on motor development; defining basic movement competence; evaluating the importance of basic movement competence for participation in physical activity and sport; how to measure movement competence; the role of both actual and perceived competence; the role of digital technology in the analysis and evaluation of motor competence; practical strategies to maximise student learning and engagement among a diverse range of children and adolescents.

SS4051 - APPLIED EXERCISE TO MUSIC IN HEALTH AND FITNESS INSTRUCTION

ECTS Credits: 6 (Year 1 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide students with the knowledge and competencies to plan and teach a safe and effective choreographed exercise to music class to members of the general population and individuals with special requirements in terms of injuries and conditions.

Syllabus: Benefits of exercise to music; health screening; pre-stretching; phases of an exercise to music class; high and low impact movements; personal technique; styles of choreography; instructional skills; observation and correction; intensities and aerobic wave effects; BPM and music selection; adaptation and progression of movements; class management, class safety and injury prevention

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Physical Education & Sport Sciences Year 2 Modules

SS4403 - COACHING SCIENCE AND PERFORMANCE 2

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3

Note: Module comprises lectures (weeks 1-7 only), 1hr of practical sports coaching (weeks 1-12), 1hr resistance training practical lab (weeks 1-12) and a 1hr conditioning practical lab (weeks 1-12).

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To enable the student to extend their coaching knowledge and ability in a specific sport and in the related areas of pedagogy, exercise prescription and physical conditioning / training.

Syllabus: Sports: Students will be required to select one sport from three offered during the semester.

In addition to the sports specific content, common elements of pedagogy (reflective practice, ethics in coaching and the development of 'expert' coaches) and applied physical conditioning will be included.
Exercise Prescription: Classification of sports. Sports needs analysis in terms of physical, technical, tactical and mental demands. Athlete assessment. Periodisation. Monitoring of training and athletic condition. Tapering for peak performance.
Physical Conditioning 2: Sport-specific warm-ups and cool down. Circuit training - different types, structure and phases. Flexibility development - active and passive techniques. Resistance training - selection, structure, progressions, regressions. Plyometric training - slow and fast SSC exercises. Devising and implementing taining programmes. Aspects of organisation and safety will be addressed throughout. Developing competence in demonstrating specific exercise techniques, competence in spotting and coaching, knowledge and understanding of progressions and regressions are key elements of this element. Prerequisites: SS4402

SS4203 - PHYSIOLOGY OF MUSCLE IN MOVEMENT

ECTS Credits: 6 (Year 2 Module)

Limited places available: 5

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module aims to deliver a thorough knowledge and understanding of skeletal muscle function. It will allow students to understand how skeletal muscle adapts to exercise, training and disease. By the end of the module students should have a full understanding of the Physiology of muscle applicable in sport and exercise sciences and in physiotherapy.

Syllabus: Skeletal muscle structure at the tissue and cell level. The process of muscle contraction at the ultrastructural and whole muscle level. The Physiology and energetics of the muscle contraction process adn cross bridge cycle. Motor units and muscle fibre types. Functional properties of the different muscle fibre types. Sources and consequences of skeletal muscle fatigue. Muscle training; neural and physiological adaptations to strength and endurance training. Muscle damage and muscle repair. Muscle disease and injury. Treatments for muscle injury and recovery.

SS4033 - CORE STABILITY AND ADVANCED RESISTANCE TRAINING TECHNIQUES IN PERSONAL TRAINING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3 doing the suite of modules

Note: modules SS4033, SS4043, SS4053, SS4063 & SS4073 Advanced Personal Training modules & have elements of Practical not specifically 'lab' hours. Desirable for students to select ALL of these modules as a 'suite of modules' as they are complimentary of each other and should not be taken on a stand-alone basis.

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide the student with the skills and knowledge to teach core stability and advanced resistance training exercises to personal training clients. The anatomical and physiological aspects of the practical application of the exercises will provide students with the knowledge to support their teaching. Students will develop the skills to demonstrate and teach the exercises proficiently and observe and correct their clients performance in a positive and informative manner. In addition, students will be able to combine a series of exercises into a programme to ensure muscle balance and take into consideration any existing posture conditions or muscle imbalances.

Syllabus: Major functional units of the body; muscles; muscle actions; origins and insertions; physiological characteristics in special populations; definition of the core; core exercises; using a stability ball; effects of joint angles, grips and stance; programming for power; plyometrics

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SS4043 - CLIENT CARE AND FITNESS ASSESSMENT IN PERSONAL TRAINING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3 doing the suite of modules

Note: modules SS4033, SS4043, SS4053, SS4063 & SS4073 Advanced Personal Training modules & have elements of Practical not specifically 'lab' hours. Desirable for students to select ALL of these modules as a 'suite of modules' as they are complimentary of each other and should not be taken on a stand-alone basis.

Rationale and Purpose of the Module: The purpose of this module is to provide the student with the skills and knowledge to set up a small personal training business which meets Irish legal requirements. The module will also take the students through their first meeting with a potential client and the interview process. Emphasis will be placed on the soft skills of communication, particularly listening to the clients needs and goals and the ability to empathise with the client. Students will develop the acumen to choose an appropriate battery of fitness assessments suitable to the clients needs and goals and to conduct these assessments in a professional and empathetic manner.

Syllabus: Business models; taxation and record keeping; data protection; policy documents; NOPs and EAPs; client-trainer relationship; effective communication skills; verbal and non-verbal communication; health/lifestyle and exercise attitude questionnaires; characteristics of high quality fitness assessments; choosing appropriate fitness assessments; procedures for a range of fitness assessments.

SS4053 - PSYCHOLOGY OF EXERCISE ADHERENCE AND HEALTHY EATING IN PERSONAL TRAINING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3 doing the suite of modules

Note: modules SS4033, SS4043, SS4053, SS4063 & SS4073 Advanced Personal Training modules & have elements of Practical not specifically 'lab' hours. Desirable for students to select ALL of these modules as a 'suite of modules' as they are complimentary of each other and should not be taken on a stand-alone basis.

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide the student with the skills and knowledge to support, motivate and encourage clients to adhere to exercise programmes and healthy eating choices. A large percentage of the general population drop out of exercise programmes within 6 weeks of commencement. A personal trainer (PT) needs to develop exercise and healthy eating adherence strategies suitable to the needs of a wide variety of clients. PTs need to be familiar with the Stages of Change Model and behaviour modification strategies and techniques and how self-efficacy and self-esteem can influence individuals participation in exercise. In addition, PTs need to have a thorough knowledge of healthy eating guidelines and the food pyramid and the causes and health implications of obesity.

Syllabus Psychological benefits of exercise; adherence and motivational techniques; goal setting; behaviour modification; Stages of Change model; food pyramid; food groups; eating for weightloss and/or weight gain; pre andpost competition eating

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SS4063 - POSTURE, MUSLE LENGTH ANALYSIS AND FLEXIBILIY IN PERSONAL TRAINING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3 doing the suite of modules

Note: modules SS4033, SS4043, SS4053, SS4063 & SS4073 Advanced Personal Training modules & have elements of Practical not specifically 'lab' hours. Desirable for students to select ALL of these modules as a 'suite of modules' as they are complimentary of each other and should not be taken on a stand-alone basis.

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide the student with

the skills and knowledge to conduct postural and muscle length analysis assessments on clients. Existing posture conditions can be exacerbated through exercise if not identified prior to the exercise programme and conversely exercise can be used to correct to help these conditions when identified prior to programming. In addition to identifying the underlying causes of a range of posture conditions students will be able to evaluate the results of assessments and design appropriate exercise programmes to help alleviate the conditions.

Syllabus Good posture; posture conditions; postural analysis; musle length analysis testing; flexibility, proprioceptors;types of stretching; foam rolling; exercises to alleviate posture conditions.

SS4073 - EXERCISE PROGRAMMING IN PERSONAL TRAINING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3 doing the suite of modules

Note: modules SS4033, SS4043, SS4053, SS4063 & SS4073 Advanced Personal Training modules & have elements of Practical not specifically 'lab' hours. Desirable for students to select ALL of these modules as a 'suite of modules' as they are complimentary of each other and should not be taken on a stand-alone basis.

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is to provide the student with the skills and knowledge to plan effective and motivating personalised exercise programmes for clients with a wide variety of needs and abilities. The module will also examine the considerations that need to be taken into account when planning exercise programmes for individuals with a number of common pre-existing conditions including diabetes, pregnancy and post-partum, hypertension, cancer, arthritis, osteoporosis, coronary heart disease and exercise programming for older adults.

Syllabus Programming design considerations; periodisation, training principles, stress adaptations; overtraining; guidelines for programming in special circumstances; exercise intensities; safe and effective warm up and cooldowns.

SS4312 - QUALITATIVE BIOMECHANICAL ANALYSIS

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: While a sound knowledge of anatomical structure is important for effective analysis of human movement activity - Analysis requires in-depth understanding of how forces act on joints and how joint structure affects movement. There is a need for the sport scientist and physical education specialist to develop effective skills qualitatively analyzing human movement, it causes and effects, through a synthesis of knowledge of anatomy and of basic mechanics. There is also a need to encourage the student to focus on the applied nature of anatomy and biomechanics in sport and Physical education. An emphasis on applied nature of this knowledge to sports performance will be achieved through extensive practice in the application of deterministic models of performance, and examination of overall performance objectives, biomechanical factor and principles and critical features of performance in a wide range of sport and exercise activities. The emphasis on this module will be on developing the student's skill in analysing movement without direct measurement and developing the ability to recommend ways of improving performance or learning as an outcome of qualitative analysis.

Syllabus: Forms of motion; translation rotation and general motion. Effects of forces. Momentum and impulse. Qualitative analysis - deterministic models and their applications in human movement: projectile based motions in sport: Jumping and throwing, striking activities etc. Cyclical movement patterns : Running, walking. Centre of gravity, line of gravity. Mechanical determinants of balance

equilibrium and stability. static and dynamic posture. Analysis of balance related situations. Angular motion of body free of support - axis of rotation, torque and angular impulse, moment of inertia applications to sports situations Motor Development and qualitative kinematic analysis

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PY4153 - SUBJECT PEDAGOGY 1 - PHYSICAL EDUCATION

ECTS Credits: 3 (Year 2 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The aim of this module is to introduce student to the principles and practices of teaching physical education in the Junior Cycle curriculum, the physical education short course and Wellbeing Guidelines. The module provides students with opportunities to consider the meaning and purpose of post primary physical education, examine teaching, learning and assessment in physical education, and develop a range of lesson designing and delivery skills needed for 2nd year school placement. The module will introduce generic teaching and managerial strategies which are linked to student learning and the design of an inclusive physical education learning environment.

Syllabus: The module will examine selected aspects of pedagogy in teaching physical education and relevant Céim core elements including: • Effective managerial skills and behaviours including safety concerns, specific to physical education. • Instructional skills and behaviours for physical education. • Teaching strategies to foster an inclusive learning environment including the use of different physical education appropriate learning platforms. • Physical Education content development. • Assessment for and of learning in physical education including in classroom based assessment (CBAs). • The use of Subject Learning and Assessment Review (SLAR) meetings to enable teachers to collectively reach consistency in judgement of students work in physical education • Planning for and assessing literacy and numeracy in physical education. • The use of digital technologies and resources to plan and deliver physical education units of learning and lesson plans. Furthermore, students will be supported to enhance their own literacy specific to physical education by providing opportunities to identify, create and communicate using verbal and written materials.

PY4163 - AESTHETIC AND EXPRESSIVE ACTIVITIES

ECTS Credits: 6 (Year 2 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Aesthetic and Expressive activities play an important role in the broader learning area of physical education. Specifically, dance and gymnastics offer alternative modes of self-expression and aesthetic engagement, extending students physical, critical, and communicative skills and provide a readily available vehicle to continue the development of fundamental movement skills. Dance and Gymnastics also to the Junior Cycle Wellbeing Indicators of Resilience and Connected, and Social Justice matters of gender, cultural identity and inclusion. The purpose of this module is the develop physical education teachers that, once graduated are confident in the subject content of dance and gymnastics and demonstrate effectively, and plan safe, enjoyable meaningful educational Physical Activity experiences. Creating is central to these subjects and as such this module is an ideal opportunity for students to take ownership of their work.

Syllabus: The emphasis in this module will be on the Curriculum Model of Personal and Social Responsibility. Through a combination of lecture based and practical labs students will experience and learn to plan for safe, inclusive and educationally meaningful learning for post-primary students in dance and gymnastics. To achieve the module learning outcomes the module content will cover: 1. practical introduction to the fundamentals of dance and gymnastics as aesthetic, cultural and expressive activities. 2. knowledge, skills and

understanding of bodily techniques, aesthetic appreciation, cultural identity, inclusive and creative composition and using basic gymnastics equipment. 3. a range of strategies for safe and effective practice in dance and gymnastics that fosters, positive emotional intelligence, positive self-image and social responsibility. 4. accessing and using resources on digital teaching and learning platforms to enhance performance, composition and appreciation in both dance and gymnastcis. 5. cooperative activitiies, teaching and learning skills, guiding students towards more adaptive and motivational patterns of behaviour. 6. Engaging in qualitative research methodologies to review literature and existing data to interrogate cultural and historical physical and gender stereotypes in relation to dance and gymnastics.

PY4143 - ADVENTURE AND WATER BASED ACTIVITIES

ECTS Credits: 6 (Year 2 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The aim of this module is to enable learners to explore the leadership skills and abilities needed to teach outdoor adventure and water-based activities. At Junior Cycle Physical Education (JCPE), JC Short Course Physical Education outdoor adventure and water based curriculum and Senior Cycle Physical Education Framework. It is essential in outdoor adventure and water based settings to be able to work collaboratively and opportunities will be given to demonstrate confidence, competence and the creativity to work in individual and a team-oriented environment. Learners will be expected to develop their own skills to work collaboratively in preparing and delivering this content. There will be a focus on both the "science" of good teaching and leadership (delivery of information, planning lessons/events, making decisions, and dealing with conflict) as well as the "art" of teaching and leadership (developing trust, communicating with sensitivity, finding the learners niche within a team of leaders, and inspiring those that will be lead). Learners will become skilled at determining risk, both physical and emotional of participants, in all physical activity situations and developing appropriate safety measures to deal with them while providing a fun environment that provides participants opportunities to learn and grow. It will also identify how technology assists in delivery a safe and effective curriculum.

Syllabus: Students will learn through practical based labs and lectures. It is designed to provide the learners with content so that they can teach in post-primary schools in a safe, inclusive and meaningful way. Content Areas: Fundamentals of Outdoor adventure and water-based Education Curricular models that best serve the content Risk, Management and assessment Minimal environmental impact Outdoor adventure and water-based activities Water safety Injury and Illnesses

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Physical Education and Sport Sciences Year 3 Modules

SS4145 - PERCEPTION AND COGNITION IN ACTION

ECTS Credits: 6 (Year 3 Module)

Limited places available: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To advance the students knowledge and understanding of the scientific methods used to gain an understanding of how motor skills are interpreted, controlled and learned To provide students with frameworks for the analysis of motor cognition and insights for the facilitation of acquisition, retention and transfer of motor skills

Syllabus: Review of the perceptual, cognitive and motor learning processes. Measuring motor skill performance and learning; retention and transfer

tests; novice and expert differences. Scientific evidence for changes due to learning. The scientific method; observation, formulation & testing of laws & principles, Hick's Law, Fitts Law; theories to explain observations, principles & laws; Adams closed loop theory, Schmidt's schema theory, motor cognition approaches. Roles of vision and proprioception in the control of movement; visual search; open loop and closed loop systems of control; motor programmes. The structuring of practice (e.g. frequency & spacing, variability, random & blocked) and its effects on learning. Implicit learning. Demonstration and learning. Instruction and learning. Feedback for learning. Whole-part practice. Learning from a dynamical systems perspective. Application of principles and of research findings. Role of practice and related factors in achieving excellence/expertise

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SS4205 - NUTRITION, EXERCISE METABOLISM AND SPORTS PERFORMANCE

ECTS Credits: 6 (Year 3 Module)

Limited places available: 4

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Probably greater than any other component of the physiology syllabus, the application of good nutritional practice and nutritional manipulation has made a significant impact upon general health and sporting performance. This course is designed to provide a thorough understanding of the nutritional needs of exercise, exercise metabolism and the use and abuse of nutritional (ergogenic) aids to improve health, training and competitive performance.

Syllabus: Fundamentals of nutrition and energy balance. Nutrient and energy value of food. An examination of 'healthy' energy balance through body composition. Critical review of BMI as a index of overweight, obesity and adiposity. Energy expenditure of sporting activities. Power and capacity of metabolic pathways. Metabolic substrate ('fuel') during exercise of varying intensity and duration. Carbohydrate metabolism. Critical role of muscle and liver glycogen. Dietary manipulation and glycogen supercompensation. Carbohydrate feeding during the event and replacement after the event. Fat metabolism. Metabolic regulation of fat oxidation. Effect of endurance training on fuel selection, fat and carbohydrate oxidation. Caffeine feeding and endurance performance. Healthy exercise: exercise metabolism in relation to obesity and insulin resistance. Protein metabolism. Muscle metabolism of amino acids during endurance exercise. Muscle protein synthesis (MPS). Exercise and amino acid regulation of MPS. Fluid balance during and in the recovery from prolonged exercise. Metabolic limitations to high intensity exercise. Phosophocreatine buffering of ATP turnover. Creatine supplementation in sport. Glycolytic flux and lactic acid production. Critical role of pH and muscle buffering. Oxidative stress during exercise. The role of free radicals. Antioxidant defence and the effects of training. Nutritional antioxidant supplements.

Prerequisites: BC4002

SS3013 - RESEARCH SKILLS AND PROGRAMME DEVELOPMENT IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 3 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide participants with a knowledge about the principles of effective research and the associated concepts and methodologies

Syllabus: Demonstrate an understanding of the principles of good research; demonstrate the ability to source latest literature and research on specific topics in the area of health and fitness; present own research to peers for critical analysis; critically assess research relating to the NCEF Certificate syllabus; critically assess old and new trends and practices within the area of exercise and fitness based on current research; present own research to NCEF Level 1 students and instructors at workshops

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PY4165 - ADAPTED PHYSICAL ACTIVITY AND PHYSICAL EDUCATION

ECTS Credits: 3 (Year 3 Module)
Limited places available: 3
Physical Education & Sport Sciences

Rationale and Purpose of the Module:
Integration and inclusion of all individuals into school structures and curricular provision is an essential feature of physical education teaching. Catering for individuals with varying levels of ability from limited to a high level requires knowledge of appropriate pedagogical principles and an ability to situate the needs of the individual on a whole school and classroom basis. Empowerment and entitlement are key concepts within this module. The purpose of this module is threefold:
1) To critically evaluate the attitudes and beliefs about teaching and learning which inform and guide his/her professional practice. 2) To act as an advocate on behalf of learners, referring students for specialized educational support as required and participating in the provision of that support, as appropriate. 3) To identify cross-curricular links and themes including citizenship; creativity; inclusion and diversity; initiative and entrepreneurship; personal, social and health education; and ICT, as appropriate to the sector and stage of education, and how these are related to life experiences.

Syllabus: This module is designed to provide students with an introduction to adapted physical activity with a focus on physical and motor characteristics of persons with disabilities as they relate to programming in physical education. The course will focus on past and present research regarding motor/physical development, assessment, and programming for individuals with cognitive, sensory, physical and health impairments. Students will be able to identify and understand how Ireland views the placement of children with disabilities and the efforts it takes to promote more inclusive physical education programmes.

SS3043 - APPLIED MULTIMEDIA IN EXERCISE AND HEALTH FITNESS
ECTS Credits: 9 (Year 3 Module)
Limited places available: 2-3
Physical Education & Sport Sciences

Rationale and Purpose of the Module: The student must have a good fundamental understanding of the opportunities offered by multimedia technology for teaching in order to facilitate an optimal learning environment.

Syllabus: Understand the influence of multimedia educational technology in teaching and learning; understand the importance of the relationship between the Principles of Adult Learning and Learning Theories to the development and evaluation of multimedia digital educational resources; Use MS PowerPoint to proficiently create effective presentations; use MS Excel to proficiently display data in graph or chart format; design simple multimedia teaching and learning tools; describe the software involved in digital image manipulation and video editing ; locate and capture images from the Web or CD ROM and perform simple digital image manipulation tasks.

SS4305 - QUANTITATIVE BIOMECHANICAL ANALYSIS
ECTS Credits: 6 (Year 3 Module)
Limited places available: 4-5
Physical Education & Sport Sciences

Rationale and Purpose of the Module: To further advance the students knowledge of biomechanics within both sport and exercise and to further explore the quantitative domain of biomechanics.

Syllabus: Overview of measurement techniques in biomechanics. Data smoothing techniques and criteria for their optimisation including residual analysis. Free body diagram analysis of human movement. Mechanical properties of biological materials. Introduction to human simulation theory. Practical Content Force plate data capture and subsequent analysis. Advanced data analysis using spreadsheet solutions. Butterworth filter design and optimisation. Introduction to simulation.

Physical Education and Sport Sciences Year 4 Modules

SS4081 - APPLIED SPORTS BIOMECHANICS

ECTS Credits: 9 (Year 4 Module)

Limited places available: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To consolidate students' understanding of kinematic and kinetic analysis by more advanced and applied biomechanical analysis skills in 2D and 3D analysis of motion, force platform analysis and analysis using state of the are applied biomechanical technologies and techniques. To apply 2D analysis techniques to selected sporting and exercise activities and to assess and evaluate the reliability and validity of field based biomechanical analysis equipment and protocols and apply these equipment and protocols to the practical sporting and exercise environments. To demonstrate an appreciation of equipment selection for biomechanical analysis.

Syllabus: • Design of biomechanical projects. Scientific writing. Analysis of data. • Kinematic analysis of sporting movements. 2D and 3D analysis. Calibration and marker set-up. Kinematic Conventions - Absolute spatial reference system, Total description of segments in 3D space. Advanced use of link segment equations and free body diagrams. • Application of kinetic analysis for strength and power testing. • Applied use of state of the art applied biomechanical technologies and analysis. • Modelling and movement. Application of biomechanical models to sporting performance.

SS4111 - APPLIED SPORT PSYCHOLOGY

ECTS Credits: 9 (Year 4 Module)

Limited places available: 5

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The emphasis in this module is on the application of psychological concepts, skills and strategies to applied settings in sport for performance enhancement. Specifically, students will explore the social and psychological factors related to sport participation and peak sport performance. Finally, the module will focus on the assessment and evaluation of the reliability and validity of psychometric questionnaires relating to performance and how they are utilised in athletic populations.

Syllabus: Content relating to performance enhancement, i.e. psychological characteristics of peak performance, characteristics of elite athletes and their development, increasing of awareness; selected mental skills and strategies (e.g. muscle relaxation, autogenic training, meditation, self talk, plans & routines, simulation training); guidelines and procedures for implementing intervention strategies; conducting mental skills training programmes; conducting a needs analysis by way of use of psychometric questionnaires. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

SS4101 - EXERCISE IS MEDICINE - DISEASE PREVENTION

ECTS Credits: 9 (Year 4 Module)

Limited places available: 4

Note: Background in Physiology required

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module brings together the knowledge gained in the last three years of the course to investigate aspects of exercise and health. These include sport performance, lifestyle and general well being. Included in this module are examples of how exercise may be used prospectively to improve the quality of life and also as an adjunct therapy to clinical medicine in the treatment of life-threatening disease. Underpinning this content is the field of physical activity science and exposure which explores physical activity behaviour determinants,

recommendations, measurement, interventions, prescription, levels and policy and promotion.

Syllabus: 1. Exercise and diabetes; 2. Exercise and cardiovascular disease; 3. Exercise and bone health; 4. Exercise and body weight regulation; 5. Exercise and psychological well-being; 6. Exercise and cancer; 7. The strategic case for Physical Activity; 8. Recommendations and Guidelines For Physical Activity Participation; 9. Correlates of Physical Activity; 10 Physical Activity- Levels of Activity and Measurement; 11 Physical Activity - Effective Interventions; 12 Physical Activity - Policy and Physical Activity Promotion

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SS4057 - INFORMATION TECHNOLOGY AND MULTIMEDIA IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 4 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide module participants with the knowledge, skills and competencies to use multimedia and information technology effectively in the Exercise & Health Fitness sector.

Syllabus: The concepts involved in the use of multi media in marketing and promotion in the Exercise & Health Fitness sector, Information Technology and Membership tracking, e-commerce and its effects on the business and management environment, the use of information technology and multimedia in the management environment of the Exercise & Health Fitness sector, providing continuing professional development and staff training to Exercise & Health Fitness personnel through the use of multi-media, Internet Business Banking and payroll software for use in a management position in the Exercise & Heath Fitness sector; advancing ones personal information technology and multimedia skills.

SS4037 - EVENT MANAGEMENT IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 4 Module)

Limited places available: 2-3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide module participants with the knowledge, skills and competencies to provide comprehensive Event Management in the Exercise & Health Fitness sector. To provide participants with a blend of knowledge and skills to equip them for undertaking tasks in event management in a variety of areas within the Exercise & Health Fitness sector including working with public, private and voluntary organizations.

Syllabus: Current research and practice across a range of event management areas with particular reference to the Exercise & Health Fitness sector, identifying & applying pragmatic solutions to a variety of problems that may arise in an event management environment. Event risk management, events operations, event business strategy and services event marketing, methods and techniques of event management in a variety of practical situations, organizational, planning, and communication skills in the management of an event in either a public, private or voluntary environment or in a combination of these, effective communication of information, ideas, complex problems and solutions to a range of audiences when managing an event, appropriate approaches to managing people in the event management environment.

SS4091 - SPORT AND HEALTH PERFORMANCE EVALUATION

ECTS Credits: 9 (Year 4 Module)

Limited places available: 2

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To gain insights into how human performance objectives/goals in sport and health are achieved by integrating as appropriate, knowledge and techniques associated with the disciplines of physiology, biomechanics, psychology, applied aspects and exercise and health. Effective application of measurement, testing, interpretation

and evaluation techniques associated with the named disciplines will be a key focus of the module.

Syllabus: This is a final year integrative (involving multiple disciplines) theoretical module that aims to complement knowledge and practical skills which have been gained to date on the degree programme and associated experiences. The course will consist of lectures and workshops on the theory and practice of the evaluation and enhancement of human performance in sport and health. In a team-based exercise, students will make a workshop presentation on an effective approach to resolving specific scenarios or objectives in the sport and health domain. In addition the student team will produce a Best Evidence translation Statement (BESt) linked to their workshop topic. Emphasis as appropriate will be placed on some or all of the following: • Purpose/benefits of Measurement, Testing and Evaluation within field • Pre-assessment screening and assessment • Selection of Characteristic to be measured (sport performance/health index) • Identification of suitable test for characteristic in question - validity, reliability, practicality • The collection of data - test protocol, standardisation, requirements, challenges • The analysis of the collected data - meaningful and innovative data interpretation • Knowledge translation - recommendations/programme design and implementation.

FI4017 - FINANCIAL MANAGEMENT IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 4 Module)

Limited places available

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide module participants with the knowledge, skills and competencies to provide effective financial management within the Exercise & Health Fitness sector.

Syllabus: Concepts and functions of financial management and application to Exercise & Health Fitness management, budget preparation and budget development, collecting, analysing and communicating financial information, innovative practices and entrepreneurship, management of working capital including the need for cash flow projections & bank reconciliations, ethical practice in the finance and accounting process in Exercise & Health Fitness management, effective use of financial resources within the Exercise & Health Fitness work environment.

MG4067 - MANAGEMENT IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 4 Module)

Limited places available

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide module participants with the knowledge, skills and competencies to provide effective management and strategic planning within the Exercise & Health Fitness sector.

Syllabus: The role of a manager - the role of manager in the development of organizational experience, the use of best practice theories and techniques in the role of effective managers and improvement of standards and delivery in the Exercise & Health Fitness sector. The key functions of management: Planning and Decision Making- Approaches to strategic planning, strategic position and strategic choices (capability, purpose, culture), the nature and importance of decision making, optimising the decision making process. Organising- skills & capabilities required in managing time, planning and scheduling tasks and projects, division of labour, organization structure and levels of supervision. Staffing- Selecting the team, getting the most out of your team, delegating work, empowering team members and initiating new ways of managing oneself and one's team. Leadership and motivation- Key functions of a leader, difference between leadership and management, motivating the team, attitudes and values in effectively building and leading an effective management and administration team, motivating keys to managing people in an effective Exercise & Health Fitness environment. Control-the nature and importance of

organizational control, types of organizational control and the relationship between organizational planning and control.

MK4028 - PUBLIC RELATIONS AND MARKETING IN EXERCISE AND HEALTH FITNESS

ECTS Credits: 6 (Year 4 Module)

Limited places available

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To provide module participants with the knowledge, skills and competencies to provide effective public relations and marketing strategies within the Exercise & Health Fitness sector.

Syllabus: Principles of positive and effective public relations applied to the Exercise & Health Fitness sector, marketing strategies, product and brand management, skills and competencies in the areas of service marketing and pricing strategies, marketing research relevant to the Exercise & Health Fitness sector, product and brand management, service marketing and pricing strategies, customer behaviour and use best practice theories in developing comprehensive customer policies, providing leadership in the development of effective public relations and marketing strategies .

Psychology

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Psychology Year 1 Modules

PS4021 - PSYCHOLOGY: THEORY AND METHOD 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 10

Psychology

Rationale and Purpose of the Module: This module provides students with a broad introduction to the historical evolution, issues, debates, themes andtheories in psychology. The course will provide a a good grounding in a range of theoretical perspectives in psychology including attention in particular to personality and biological psychology.

Syllabus: This module is the first of two modules which provide a broad introduction to the discipline of psychology. This module will begin with a brief historical and philosophical overview of the roots of psychology and then move on to cover the psychodynamic perspective, behaviourism and learning theory, the biological basis of behaviour, and cognitive psychology. Within the biological perspective the focus will be on motivation and emotion, and within cognitive psychology the focus will be on memory.

PS4031 - PSYCHOLOGY AND EVERYDAY LIFE

ECTS Credits: 6 (Year 1 Module)

Psychology

Rationale and Purpose of the Module: This module will introduce students to a range of fundamental theoretical perspectives and issues in general psychology through examining their relevance in everyday life. Through exploring everyday issues students will not only learn about theoretical perspectives but will also gain a basic knowledge of how psychology may be applied.

Syllabus: Through exploring some key studies in psychology, students will gain a basic understanding of the main investigative techniques used by psychologists. The range of topics will include; definitions of psychology; communication and body language; personality; sex and gender; social interaction; emotion; brain and behaviour; health and illness;
human development; psychological problems; perception and thinking; learning; humans and animals; applications of psychology

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PS4041 - PRACTICAL PSYCHOLOGY 1

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Limited places available: 5

Psychology

Rationale and Purpose of the Module:
To introduce students to the range of research methods employed in psychology and to develop student's ability to work with quantitative data and SPSS in particular

Syllabus: This practical class introduces the range of methods employed in psychology to students. The value of experiments, observational, survey and interviews and case studies work are considered using illustrative examples. Practical skills in these methods are developed through the use of selected examples. Students are also introduced to important IT skills such as library search skills and SPSS for coding of data via practical work.
Prerequisites: PS4021

Psychology Year 2 Modules

PS4011 - SOCIAL PSYCHOLOGY 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 15

Psychology

Rationale and Purpose of the Module: To provide a broad introduction to the field of social psychology which will be built on in future modules. The lectures will provide a framework around a range of topics in social psychology.

Syllabus: Social psychology is a field of psychology that considers the nature, causes, and consequences of human social behavior. The module

will cover theories, models, key concepts and issues related to attitudes and behaviour, social influence, intra and inter group processes, pro-social behaviour, and affiliation, attraction and love.

PS4043 - EMPIRICAL PSYCHOLOGY 1

ECTS Credits: 6 (Year 2/3 Module)

(Lab-Based Module)

Limited places available: 5

Psychology

Rationale and Purpose of the Module: To introduce students to a range of laboratory based activities in psychology and to develop studentÆs ability to design, collect, code and analyse empirical data using experimental methodologies.

Syllabus: Classical approaches to psychology emphasise the importance of the experimental paradigm to understanding behaviour and mental processes. This lab based module introduces students to the traditional experimental approach and familiarises them with concepts such as randomisation, experimenter bias, confounding variables via a series of practicals. Issues such as correlation and causation are discussed and the necessity of quasi experimental approaches highlighted. Students learn to design, conduct, code and analyse experimental data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines.

PS4022 - PSYCHOLOGY OF THE PERSONALITY

ECTS Credits: 6 (Year 2/3 Module)

Limited places available: 15

Psychology

Rationale and Purpose of the Module: For students to understand how the field of psychology has approached the topic of personality and for students to develop knowledge of the ways personality and individual difference, intelligence and aptitude are constructed and tested in psychology.

Syllabus: Personality is a collection of emotion, thought and behaviour patterns that are unique to an individual. Through a series of lectures and practical tutorial sessions, topics relevant to the psychology of personality will be explored; including defining personality, temperament, aptitude and difference; personality and intelligence testing; and models including factorial models, typologies and circumplexes.

PS4035 - BIOLOGICAL BASIS OF HUMAN BEHAVIOUR

ECTS Credits: 6 (Year 2/3 Modules)

Limited places available: 5

Psychology

Rationale and Purpose of the Module: Structure and function of the mammalian nervous system with reference to the biological bases of major classes of behaviour, including neuroanatomy and neurophysiology, role of neurotransmitters in brain function, CNS and endocrine influences on behaviour, localisation of brain function, the importance and limitations the of case study approach and animal research.

Prerequisites: PS4042, PS4021

Psychology Year 3 Modules

PS4045 - ADVANCED RESEARCH METHODS

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Psychology

Rationale and Purpose of the Module: This module will build on the basic methods and designs covered in introduction to Research Methods (PS4033). Students will be introduced to advanced experimental, quasi-experimental, and survey designs along with the statistical techniques appropriate to analyse data produced by these approaches. Students will examine the fundamental assumptions of psychological research and practice. In addition, students will be introduced to principles of qualitative research design, data collection and some specific analytic techniques.

Syllabus: Advanced statistical techniques for survey and experimental research such as regression, multivariate ANOVA and categorical data analysis. Qualitative methods and in particular key concepts from critical psychological perspective. Design experiments, quasi-experiments, and surveys. Undertake statistical analysis and interpretation. Design qualitative research. Undertake qualitative analysis and validation. Evaluate the outcomes of studies. Report findings of studies.

Prerequisites: PS4033, PS4042, PS4021

Psychology Year 4 Modules

PS4027 - APPLIED PSYCHOLOGY

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Psychology

Rationale and Purpose of the Module: For students to develop an understanding of how psychology is applied in practice. To introduce students to the range of areas in which professional psychologists work

Syllabus: To examine how major theories and core areas of psychology can be applied in professional practice

Prerequisites: PS4042, PS4021

PS4107 - ABNORMAL AND CLINICAL PSYCHOLOGY

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Psychology

Rationale and Purpose of the Module: Abnormal psychology is the study of mental illness and distress, as well as psychological dysfunction. The aim of this module is to foster a critical appreciation of some key topical issues at a theoretical level in abnormal psychology, as well as how this is applied in the practice of clinical psychology.

Syllabus: Through a series of lectures, students will be introduced to the theoretical perspective on several categories of common mental health disorders, including mood and anxiety disorders. In addition, other topics in abnormal psychology, such as dysfunctional behaviour, will be examined from a range of perspectives, including cognitive, behavioural, and neurological. The focus is on how psychological models, particularly cognitive ones, can aid our understanding of psychological disorders. The course will also examine how the theoretical understanding of disorders translates into practice in clinical settings. Contemporary models of clinical practice and psychotherapeutic intervention will be introduced, including scientist and reflective practitioner models, and formulation and assessment models of clinical psychology. The link between clinical psychology and health care settings will also be explored. In this way we will demonstrate that psychological models have considerable application to clinical practice. This provides a valuable introduction to key issues and concepts that will be experienced in clinical practice, by students who decide to move into clinical work after graduation.

PS4097 - DEVELOPMENTAL PSYCHOPATHOLOGY

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Psychology

Rationale and Purpose of the Module: to introduce students to the rapidly developing field of developmental psychopathology to improve students understanding of the role that social, psychological, and biological factors play in determining mental health and to highlight the importance of the developmental approach to understanding adjustment and maladjustment.

Syllabus: The specific focus of this module is developmental psychopathology. Developmental psychopathology is a domain of psychology which concentrates on how psychosocial and biological

factors contribute to psychological adjustment and maladjustment. The module will introduce students evidence relating both environmental and genetic determinants of mental health and consider the role that developmental factors may have in the expression of mental health problems.

Prerequisites: PS4012

PS4168 – ECONOMIC PSYCHOLOGY

ECTS Credits: 6 (Year 4 Module)

Limited places available: 30

Prior psychology knowledge required

Psychology

Rationale and Purpose of the Module: Economic psychology describes the psychological processes underlying economic behaviour and decision making, as well as the psychological and societal consequences that result from these processes. Specifically, this module integrates consideration of psychological processes with relevant economic phenomena, such as unemployment and consumption, using methods derived from psychological and behavioural science. The module focuses on theory development as well as the application of findings to address societal problems.

Syllabus: Through a series of lectures, students will be introduced to historical and contemporary theories in decision making, (e.g., prospect theory, heuristics, mental accounting), and the influence of situational and personal variables on preference and choice. Specifically, lectures will focus on variables such as situational cues, sociological conditions, emotional states, self-control capacities, and individual differences. The lecture series will also address consequences of economic behaviour for people on a personal level, such as their subjective well-being, and on a societal level, such as unemployment. Throughout the lecture series, theory building in economic psychology and the application of findings in this research area will be critically discussed.

Nursing & Midwifery

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Nursing & Midwifery Year 1 Modules

Note For All Nursing & Midwifery Modules: Considerations around the content and year of programme for the student is to be considered and the Department International Coordinator is happy to liaise with potential students with this regard.

NM4091 - PHILOSOPHIES UNDERPINNING PERSON CENTRED NURSING

ECTS Credits: 3 (Year 1 Module)

(Tutorial-Based Module)

Limited places available: 3

Nursing & Midwifery

Rationale and Purpose of the Module: This module aims to introduce students to philosophies, principles and values underpinning person centred general nursing practice.

Syllabus: Development of general nursing. Introduction to nursing values and philosophy; code of conduct; confidentiality; scope of practice; legal; professional and ethical practice. The role of the nurse in supporting individuals and families; caring and compassion as foundation for nursing; respect, choice and dignity; person centred nursing. Introduction to the role of the nurse in relation to social justice and cultural sensitivity. Models and theories of nursing; assessment frameworks; care planning documentation; evidence based practice. Introduction to nursing metrics and audit.

NM4121 - FOUNDATIONS FOR ENGAGED LEARNING

ECTS Credits: 3 (Year 1 Module)

(Tutorial-Based Module)

Limited places available: 3

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide students with a foundation for becoming a lifelong reflective learner and critical thinking practitioner. It will support student's integration into third level environment and assist in learning how to balance university commitments and life.

Syllabus: Transition to third level learning and scholarship. Maximising learning styles and taking a proactive approach to individual learning, developing emotional intelligence and managing self and wellbeing. Developing verbal, digital and academic writing skills. Library, information and communication technology. Study and time management skills. Academic integrity. Searching and finding appropriate evidence, developing critical thinking skills, using evidence in practice, database, information and reference management. Collaborative learning. Reflective practice as a strategy for personal and professional development.

NM4161 - COMMUNICATION AND INTERPERSONAL RELATIONSHIPS IN NURSING AND MIDWIFERY

ECTS Credits: 6 (Year 1 Module)

(Clinical skills Lab-Based Module)

Limited places available: 2

Nursing & Midwifery

Rationale and Purpose of the Module: This module will introduce skills and knowledge necessary for the development of respectful, equitable and effective communication in nursing and midwifery practice. The development of students' communication and interpersonal skills will be facilitated so as to enhance professional and therapeutic relationships.

Syllabus: Communication theories, models. Person-centred communication principles. Therapeutic and professional relationships. Self-awareness and therapeutic use of self. Bridges and barriers in the development and maintenance of therapeutic relationships. Assertive communication.

Communicating in challenging and difficult circumstances. Communicating information: recording clinical practice; communicating with colleagues; social media, email. Group communication. Interprofessional communication. Intercultural communication. Introduction to communicating with persons with impairments/disabilities including physical, sensory, cognitive, affective and intellectual. Self - care strategies including relaxation skills.
Communication skills: verbal and non-verbal: listening; interviewing; breaking bad news; conflict situations; group communication and group dynamics; documentation; relaxation skills.

NM4241 - UNDERSTANDING INTELLECTUAL DISABILITY
ECTS Credits: 3 (Year 1 Module)
(Tutorial-Based Module)
Limited places available: 3
Nursing & Midwifery

Rationale and Purpose of the Module: This is the first module in which students are introduced to the concept of intellectual disability and person centred approaches underpinning the professional values and conduct of the nurse. The implications of living with impairments and classification of disability by society for the person, their family and peers will be explored.

Syllabus: Theories and models of disability; concepts of impairment, enabling and disabling environments. Prevalence, incidence, causation and manifestations of intellectual disability. Classification criteria and terminology; awareness, stigma and life opportunities.
Effects of disability on the nuclear, extended family and society. Theory and application of the principles of normalisation and personalisation, empowerment, advocacy and person-centeredness. Nurse-client relationship and communication.

NM4261 - INTRODUCTION TO MENTAL HEALTH NURSING
ECTS Credits: 3 (Year 1 Module)
(Tutorial-Based Module)
Limited places available: 2
Nursing & Midwifery

Rationale and Purpose of the Module: To introduce the student to the philosophical and theoretical foundations underpinning mental health nursing practice that offer ways of understanding the nature of mental health and recovery.

Syllabus: Introduction to the history, philosophy, theories and models underpinning mental health nursing; Conceptualisation of the role of the mental health nurse in a variety of health care settings; mental health service/ structure. Scope of nursing practice, legal, professional and ethical practice. Introduction to the role of the nurse in psychosocial and pharmacological interventions and evidence base approaches to care. Practising as part of the MDT collaborative engagement and partnership working in mental health care. Compassionate person centred nursing. Promoting recovery, enhancing resilience, cultivating hope and relationship building; values and principles underpinning recovery, strengths based approaches. Citizenship, personhood, social inclusion, addressing discrimination and stigma. Maintaining a safe environment and supporting services users to respond to health and safety situations in the home e.g. getting help, managing minor accidents e.g. burns. Global and technological healthcare contexts. The role of the service user movement, working with diverse cultures.

Nursing & Midwifery Year 2 Modules

NM4103 - INTELLECTUAL DISABILITY EARLY CHILDHOOD NURSING
ECTS Credits: 6 (Year 2 Module)
(Clinical skills Lab-Based Module)
Limited places available: 3

Nursing & Midwifery

Rationale and Purpose of the Module: Building on previous knowledge this module addresses nursing aspects related to early childhood and specific support and intervention strategies required to assist children with an intellectual disability and their families in promoting health and wellbeing from birth to twelve years of age.

Syllabus: Pre, peri and post natal development, screening tests at birth and premature reflexes. Knowledge of specific intellectual disability conditions. Early intervention services, family centred care, respite care, foster/shared care schemes. Promoting independence within social and self-help skill development. Communication and language needs of the child, valuing play, music and creative interventions as developmentally appropriate. Rights of the child in; health, education, learning and integration into mainstream services. Child care policies; concept of child protection; recognition and consequence of child abuse, procedures and guidelines for reporting abuse. Management of; sleep, postural care, continence, contractors, restrictions of movement and medications.

Person centred nursing skills. The nursing process and family centred approaches; care plan and documentation Nutritional assessment and support of the child Mobility and posture care (active and passive limb exercises, sleep hygiene and positioning supports) Respiratory care (oxygen and nebuliser therapy, inhaler techniques and suctioning technique) Facilitating communication, health and wellbeing through creative medium e.g. play, music.

NM4264 - RESPONDING TO COMPLEX NEEDS DURING PREGNANCY

ECTS Credits: 6 (Year 2 Module)

(Clinical skills Lab-Based Module)

Limited places available: 2

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to facilitate students in the assessment, care and management of women experiencing at risk and complicated pregnancy.

Syllabus: Assessment, investigations and management of maternal and fatal well-being in women experiencing at risk and complicated pregnancy including maternal mortality and morbidity. Bleeding before the 24th week of pregnancy; other problems associated with early pregnancy including antenatal infection. Antepartum haemorrhage. Hepatic disorders. Abnormalities of the amniotic fluid. Medical conditions of significance: hypertensive disorders: endocrine disorders; cardiac disease; renal disease; respiratory disorders; haematological disorders, neurological disorders; incorporating medication management. Documentation including use of IMEOWS. Clinical skills: Principles of management of bleeding including basic life support measures Management of severe pre-eclampsia, fulminating pre-eclampsia and eclampsia including medication management Management of epileptic seizures Management of an asthmatic attack Management of blood sugar monitoring, hypoglycaemia and hyperglycaemia. Venepuncture Skills

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NM4263 - INTELLECTUAL DISABILITY ADOLESCENT NURSING

ECTS Credits: 6 (Year 2 Module)

(Clinical skills Lab-Based Module)

Limited places available: 2

Nursing & Midwifery

Rationale and Purpose of the Module: Building on previous knowledge this module addresses nursing aspects related to young and middle childhood and specific support and intervention strategies required assisting in health and wellbeing of children from twelve to 18 years of age.

Syllabus: Theories related to adolescence. Challenges for the adolescent with sensory physical and verbal impairments. Transitioning from childhood; rights of the adolescent with an intellectual disability; communication, promotion of choice, decision making, risk taking, empowerment, lifestyle and health well-being, behavioural health choices, smoking alcohol and diet. Health promotion

and therapeutic and creative activities including leisure and recreational provision for adolescents in developing interpersonal relationships, friendships. Sexuality, sexual development, sexual health, relationship skills, recognising and responding to abuse. Person centred nursing skills Care planning underpinned by principles of person centred care
Personal care (assisted independent hygiene programmes). Nutritional assessment and support of the adolescent. Facilitating communication, health, and wellbeing (sexuality and relationship development) Health promotion skills (body awareness, sexuality and relationships development, testicular awareness, breast awareness).

NM4153 - PERSON CENTRED SURGICAL NURSING

ECTS Credits: 6 (Year 2 Module)
(Clinical skills Lab-Based Module)
Limited places available: 4
Nursing & Midwifery

Rationale and Purpose of the Module: This module connects the principles and fundamentals of previous learning and provides students with an understanding of person-centred surgical nursing from a theoretical and practice perspective.

Syllabus: Person centred surgical nursing; pre and postoperative assessment and care for planned, emergency and day surgery through exemplars: laparoscopic and open surgery for example, bowel surgery; breast surgery, fracture assessment and management. Body image. Patient education and promoting recovery. Minimising risk of surgical complications (thromboembolism, sepsis and shock). Acute pain management and wound care.
Post anaesthetic care-topical, local, regional and general.
Clinical skills, Pre and postoperative assessment tools
Wound assessment and management strategies
Management of skin closure and wound drainage devices Management of immobilisation
Management of nausea and vomiting
Naso -gastric drainage Stoma care.

NM4163 - NUTRITION FOR NURSING PRACTICE

ECTS Credits: 6 (Year 2 Module)
(Clinical skills Lab-Based Module)
Limited places available: 4
Nursing & Midwifery

Rationale and Purpose of the Module: This module connects previous learning providing undergraduate students with an understanding of key nursing contributions to person centred care in relation to nutrition, hydration and elimination.

Syllabus: Physiology of digestion, metabolism and utilisation of nutrient components for the promotion and maintenance of health and prevention of disease. Biopsychosocial and culture dimensions to the fundamentals of promoting healthy nutrition, hydration and elimination. Assessment, interventions and management for persons experiencing dehydration, undernutrition, malnutrition and obesity. Person centred practices at mealtime. Diabetes, osteoporosis, anemia, inflammatory bowel disease, promoting continence and preventing constipation. Clinical skills: Nutritional assessment Assisting individuals with eating drinking and swallowing difficulties. Enteral and parenteral management of nutrition (PEG feeding). Blood glucose monitoring, Insulin administration techniques, Continence assessment, Urinary catheterization care.

NM4242 - MATERNAL AND INFANT NUTRITION

ECTS Credits: 6 (Year 2 Module)
(Clinical skills Lab-Based Module)
Limited places available: 3
Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to enable the student to critically consider the factors that promote and support maternal and infant nutritional wellbeing.

Syllabus: Physiology of digestion, metabolism and utilisation of nutrient components for the promotion and maintenance of health and prevention of disease. Nutritional needs during pregnancy and lactation. Impact of nutritional status on the woman, fetus and infant. Nutrition and selected conditions. Healthy weight management before, during and after pregnancy. Nutritional requirements of the neonate; social - cultural context of infant feeding; informed choice; national and international breastfeeding policies. Anatomy and physiology of lactation. Biochemistry of human milk. Health care practices that support breastfeeding and formula feeding including signs of effective feeding. Breastfeeding management under difficult circumstances: breastfeeding management when the mother is ill; drug therapy and breastfeeding. Principles of safe formula preparation and feeding. Hospital and community promoting, supporting and protecting breastfeeding. Clinical skills:

Brief interventions for nutrition for the perinatal period

Brief interventions for weight management Counselling skills to support breastfeeding including correct positioning for skin to skin Key principles for positioning and attachment Hand expression, pump expression, cup feeding/finger feeding, breast milk storage Key principles for safe formula feeding.

NM4253 - MIDWIFERY CARE FOR THE POSTNATAL MOTHER, BABY AND FAMILY

ECTS Credits: 6 (Year 2 Module)

(Clinical skills Lab-Based Module)

Limited places available: 2

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to explore the provision of midwifery care in the postnatal period for the mother, baby and family.

Syllabus: Physiology of the puerperium, monitoring postnatal progress including postnatal examination and assessment, care required post- operative birth, urinary bladder management. Transition to extrauterine life, thermoregulation. Initial steps of neonatal resuscitation. Monitoring progress of the neonate including examination.

Meeting the safety needs of mother and baby.

Registration of birth. Physiological jaundice. Newborn screening. Vaccinations and immunisations. Parenting and attachment. Promoting a healthy psychological adaptation to motherhood and fatherhood. Discharge planning for the woman and infant. Care of women and families experiencing a perinatal loss. Clinical skills:

Postnatal examination of the mother

Examinations of the baby

Neonatal vital signs including pulse oximetry Skin care and hygiene of the baby

Newborn bloodspot screening technique Documentation and administration of medication to the mother and baby Perinatal mental health assessment tools

Parenting skills

Discharge planning for mother and baby

Initial steps of resuscitation of newborn Bereavement and perinatal loss workshop.


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Accounting & Finance

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Accounting & Finance Year 1 Modules

AC4001 - PRINCIPLES OF ACCOUNTING

ECTS Credits: 6 (Year 1 Module)

Accounting & Finance

Rationale and Purpose of the Module: This module is designed to introduce the student to the fundamental concepts and practices of financial accounting.It treats accounting as the manifestation of various social and political pressures and thus considers it in its social context. By learning how to measure financial performance and financial position, the student will appreciate accounting as forming the basis for financial decision-making.

Syllabus: This module introduces the student to the fundamental concepts and practices of financial accounting. Accounting is presented as a manifestation of various social and political pressures, which required that techniques be developed to account for trading and wealth. The topics covered include accounting in its political, regulatory, historical, social, economic, corporate governance and international contexts; introduction to the theoretical, conceptual and regulatory frameworks of accounting; traditional accounting model; capital, income and profit and measurement; principles of double entry bookkeeping; books of prime entry, ledgers, trial balance, internal controls, use of computers in recording and control of data, construction of final accounts for sole traders, partnerships and limited companies; accruals, prepayments and adjustments; depreciation and stocks; distribution of profits; profit and loss accounts and balance sheets, cashflow statements; nature, purpose, scope and framework of auditing. The ability of accounting to provide public accountability forms the basis for integrating ethics into the subject matter.

Accounting & Finance Year 2 Modules

FI4003 - FINANCE

ECTS Credits: 6 (Year 2 Module)

Accounting & Finance

Rationale and Purpose of the Module: The course provides an introduction to corporate finance and finance theory. The aim of the course is to develop students understanding of fundamental topics in corporate finance and financial theory. The course provides students with the skills needed to engage in basic analysis of projects and financial assets.

Syllabus: The primary focus of this introductory course is on discounted cash flow techniques, and their application to corporate finance. This course introduces the concept of the time value of money, and the key methods of project appraisal including the net present value method, the payback period, the book rate of return, internal rate of return, profitability indices etc. the merits and demerits of each are explained. Qualitative aspects of capital budgeting and investments are also covered. The concept of market efficiency and of the link between risk and return are illustrated by reference to historical returns. Basic issues around share valuation are also discussed, and the students are introduced to derivative instruments, and how they may be used both defensively and aggressively.

IN4003 - PRINCIPLES OF RISK MANAGEMENT

ECTS Credits: 6 (Year 2 Module)

Accounting & Finance

Rationale and Purpose of the Module: To introduce the students to concepts and principles relating to the management of risk in both the public and private sector. The student will be expected to understand basic mathematical and financial models in dealing with risk theory as well as understanding the basics of the central theories on risk.

Syllabus: Concepts of risk, pure and speculative risk; actuarial mathematics and elementary risk theory; perceptions of risk; risk in the economic and legal environment; models of risk management; risk management as a decision-making process, identification, analysis, evaluation, control, financing of risk; risk management in an organisation and in the public sector; formulation and implementation of risk management strategies; quality and risk management.

TX4204 - CAPITAL TAXATION
ECTS Credits: 6
Accounting & Finance

Rationale and Purpose of the Module: This module is designed to provide students with an understanding of the theoretical and legal framework of capital taxation. It aims to give students a thorough understanding of the manner in which individuals taxed in the State on the disposal of assets.

Syllabus: Introduction to Capital Gains Tax; Calculation of Capital Gains Tax; CGT Exemptions & ReliefÆs; CGT Retirement Relief; Transfer of a Business to a Company; CGT and Share Transactions CGT and Liquidation of Companies; Company Purchasing its Own Shares; Principle Private Residence Relief; CGT and Development Land; Introduction to Capital Acquisitions Tax; Basic Concepts & Reliefs; Business Relief; Agricultural Relief; Taxation of Trusts; Foreign Aspects; Stamp Duty.

AC4213 - FINANCIAL ACCOUNTING
ECTS Credits: 6 (Year 2 Module)
Accounting & Finance

Rationale and Purpose of the Module: The purpose of the module is to equip students with an understanding of the context of financial accounting in the business environment, and to provide fundamental accounting capabilities. This module will be offered on the programme Higher Diploma in Accounting (title to be changed to Professional Diploma in Accounting)

Syllabus: The purpose of the module is to equip students with a high knowledge of financial accounting in the business environment. Students will obtain an understanding of fundamental accounting capabilities through teamwork, group discussions and assignments. The syllabus covers the following areas: -> Basic accounting principles/definitions, fundamental concepts and valuation bases. -> The regulatory framework of accounting including the role and objectives of the International Accounting Standards Board; the purpose of accounting standards and the standard-setting process. -> The accountant's role in the preparation and reporting process (including possible ethical issues that may arise and the need for a professional and responsible approach to their actions and decisions at work). -> Books of prime entry and the nominal ledger (including the principles of double-entry accounting and the recording of transactions resulting in income, expenses, assets, liabilities and equity). -> Control accounts and the trial balance (including identifying and correcting errors in accounting records and financial statements; preparing Cash book and bank reconciliations). -> The preparation of sole trader accounts including a statement of comprehensive income, statement of financial position and statement of cash flow. -> The preparation of partnership accounts (including partners' capital accounts, changes in profit sharing ratios and the distribution of profits and losses). -> Introduction to company accounts.

Accounting & Finance Year 3 Modules

AC4305 - FINANCIAL INFORMATION ANALYSIS
ECTS Credits: 6 (Year 3 Module)

Rationale and Purpose of the Module: The purpose of the module is to increase students' awareness of the information content of financial data and financial reports. The module considers the

role and impact of accounting information in modern society within a variety of contexts. The module will enable students to critically analyse and interpret financial information in order to improve their decision-making capabilities.

Syllabus: The nature of accounting information and its role in financial and other markets The regulatory framework of accounting information and the needs of users The conceptual framework of accounting information: recognition and measurement issues, fair value Theories of financial analysis including efficient market hypothesis Corporate governance: shareholder value and stakeholder theory perspectives including the Anglo-American and European models Preparation of financial statements: income statement and balance sheet Analysis of financial statements: ratio analysis, uses and limitations, accounting information as an aid to decision-making Creative accounting: off-balance sheet financing, revenue recognition, fraud, the role of ethics and whistleblowing Corporate social responsibility: environmental accounting, sustainability, narrative reporting and the green agenda International accounting issues and developments: harmonisation and convergence, global reporting needs

Prerequisites: AC4001

IN4015 - RISK AND INSURANCE

ECTS Credits: 6 (Year 3 Module)

Accounting & Finance

Rationale and Purpose of the Module: To meet the needs of the risk management and insurance industry by providing students with a strong understanding of how the insurance industry operates. Students will also learn the important principles underlying risk management. The interest in, and study of, risk has grown significantly due to improvements in the technology used to assess and measure risk and the development of innovations in the insurance and capital markets that control risk. Insurance is one of the main mechanisms used to control risk, through the transfer of that risk to a third party, usually an insurance company. The insurance company in turn is exposed to a variety of risks and can transfer some of these through reinsurance whilst other risks can be controlled using alternative markets. This module will introduce students to the role of insurance within the health market. Furthermore, this module seeks to raise awareness of global issues such as public health, natural disasters, terrorism etc. and the mitigating role of risk management and insurance.

Syllabus: The module details the historical development of insurance industry and more generally the discipline of risk management. The theoretical framework used by insurance companies to internalise risk and attribute a price to that risk are discussed in detail. The module details the development and implementation of a risk management strategy by both private corporations as well as public sector bodies.

IN4005 - RISK ANALYSIS

ECTS Credits: 6 (Year 3 Module)

Accounting & Finance

Rationale and Purpose of the Module: 1. To develop in the student an understanding of and insight into risk analysis. 2. To examine the nature of the interface between the corporate risk management function and the insurance sectors servicing response. 3. To introduce students to the theory and practice of risk analysis and to acquaint students with the complex and rapidly changing environment within which risk managers operate.

Syllabus: 1. Analysis of overall corporate risk - concept of enterprise risk management - categories of risk and control strategies 2. Statistical concepts and probability 3. Types and costs of risk 4. Managing risk 5. Decision making under conditions of total uncertainty - minimax ; maximax criteria - minimal regret criterion Using measures of probability - determining threshold probability factors - economic value of information. 6. Bayesian decision analysis - prior probabilities - insurance applications 7. Design of retention programmes - types of retention/accounting treatment - overview of process - determination of ruin probabilities 8. Portfolio management - portfolio co-variance factors solvency strategies 9. Alternative risk transfer 10.

Risk control - use of NPV as decision tool - stochastic interest rate theory 11. Risk analysis - Intellectual Capital - types of intellectual capital - risk management options 12. Analysis of the occupational noise risk 13. Analysis of the ionising radiation risk 14. Analysis of the pandemic.

FI4015 - CORPORATE FINANCE
ECTS Credits: 6 (Year 3 Module)
Accounting & Finance

Rationale and Purpose of the Module: This module provide students with a solid grounding in corporate finance, its application in share valuation within international capital markets and focuses on the decisions faced by corporate financial managers.

Syllabus: The course builds on students existing knowledge of discounted cash flow technique and covers more advanced capital budgeting, taking into account inflation, uncertainty and tax. Simulation and scenario analysis are covered and concept of a real option is introduced. The students are introduced to the international capital markets, and the main approaches to share valuation are discussed and contrasted. The importance of the assessment of risk and its impact on returns from financial assets are introduced, leading to an assessment of the cost of capital for a firm. The theory of the firm is explored in more detail, under the framework of agency theory. Dividend policy is studied, by reference to theory, taxation, the value of the firm and the wealth of shareholders. Capital structure is covered from a similar perspective. Mergers and acquisitions are evaluated. Ideas around the impact of corporate financial decisions on wider stakeholder groups and society more generally are discussed.
Prerequisites: FI4003

Accounting & Finance Year 4 Modules

AC4007 - ADVANCED FINANCIAL REPORTING
ECTS Credits: 6 (Year 4 Module)
Accounting & Finance

Rationale and Purpose of the Module: The aim of this module is to develop a student's understanding of the theory and practice of selected international accounting standards. It encourages the student to critically evaluate selected accounting standards in light of their historical development and regulatory context.

Syllabus: The module will consider the theory and practice of selected international accounting standards and issues. Focus will be on the preparation and reporting of information to external users of financial information, especially, but not exclusively, equity investors. The international accounting standards and issues are examined in light of their historical development and discussions will not be solely around the actual content but what the regulations ought to be or might be. The module will cover the International Financial Reporting Standards.

AC4417 - MANAGEMENT ACCOUNTING 1
ECTS Credits: 6 (Year 4 Module)
Accounting & Finance

Rationale and Purpose of the Module: This modules provides students with an in-depth understanding of the role and purposes of management accounting in the management process. It deals with the applications and systems of management accounting that serve the information needs of contemporary organisations. It aims to give students an appreciation of the frontiers of management accounting and the associated theoretical and empirical research activity.

Syllabus: Objectives, scope and framework of management accounting; role and purpose of management accounting; management accounting and the business environment; ethical guidelines and challenges; cost terminology, concepts and classification;cost accumulation for inventory valuation and profit measurement; cost behaviour

and analysis; cost-volume-profit relationships; cost-estimation methods; learning curve and non-linear cost functions;cost systems and design choices; job costing; activity-based costing and management; inventory costing and capacity analysis; variable versus absorption costing debate; information for planning and control; management control systems; organisational and social aspects of management accounting; responsibility accounting and the master budget; kaizen budgeting; activity-based budgeting; flexible budgets; standard costing and variance analysis.

FI4007 - INVESTMENTS: ANALYSIS AND MANAGEMENT

ECTS Credits: 6 (Year 4 Module)

Accounting & Finance

Rationale and Purpose of the Module: The module is designed to provide students with a thorough understanding of international financial investments. In particular the module will provide students with an appreciation of the investment environment and the skills and critical awareness necessary to make good investment decisions. More specifically, key material includes portfolio and capital market theory, asset valuation, investment management and behavioural aspects of investment decisions.

Syllabus: The topics covered include an introduction to the investment environment: equity securities, fixed income securities; the efficient market hypothesis and behavioural finance; risk and return: measures of risk and returns; Portfolio and capital market theory: dealing with uncertainty, portfolio risk and return, analysing portfolio risk, the role of diversification, modern portfolio theory; Portfolio selection: efficient portfolios and diversification; Asset Pricing Models: risk-return trade-off, capital market line, security market line, Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT); Equity valuation: dividend discount models, technical analysis, the role of sentiment; Evaluation of investment performance.

Prerequisites: FI4407

TX4007 - TAXATION FOR CORPORATES

ECTS Credits: 6 (Year 4 Module)

Accounting & Finance

Rationale and Purpose of the Module: This module aims to provide an understanding of Irish Corporation Tax, the rationale for incorporation of a business, the taxation implications of close company status and the effective use of losses and group reliefs. It also introduces students to the principles of Value Added Tax (VAT) and the application of VAT in a business context.

Syllabus: General principles of Irish Corporation Tax. The rationale for, and the tax implications of, incorporation. Computation of the corporation tax liability. Loss relief for companies, group relief for losses, charges and transfer of assets. Close companies, definition and consequences. Tax planning for companies including restructuring to maximise tax reliefs. Current issues in Corporation Tax. Introduction to VAT, general principles, administration, registration and deregistration, exemptions and zero rating, inter EU sales and purchases. VAT on property transactions.

FI4407 - FINANCIAL INSTITUTIONS AND MARKETS

ECTS Credits: 6 (Year 4 Module)

Accounting & Finance

Rationale and Purpose of the Module: The aim of this module is to give students an awareness and understanding of the current issues in, and key features of, the financial markets; Money Markets, Bond Markets, Foreign Exchange Markets and Derivative markets. It builds on the basic knowledge of finance obtained from the second year core module in Finance. It introduces the students to the various types of financial institutions and explores the function, typical activity and risk profile of each.

Syllabus: The determinants of interest rates and how interest rates affect bond valuations; primary

and secondary markets; money markets; bond markets; equity/stock markets; foreign exchange markets, derivative markets; the differences between investment banks and commercial banks; how companies and issuers interact with financial institutions; insurance companies; hedge funds; venture capital companies; risk exposures of financial institutions; regulation; contributors to the financial crisis.
Prerequisites: FI4003

IN4007 - GOVERNANCE AND RISK
ECTS Credits: 6 (Year 4 Module)
Accounting & Finance

Rationale and Purpose of the Module: To develop in the student an understanding of and insight into the concepts of goverance and risk 2. To examine the nature of the interface between governance structures and risk management practices.

Syllabus: The students will gain a general understanding of risk and governance and produce an some in-depth analysis of specific examples. The content will address risk and governance from a number of disciplinary perspectives including accounting, regulation and legal.

IN4427 - INSURANCE ORGANISATIONS AND MARKETS
ECTS Credits: 6 (Year 4 Module)
Accounting & Finance

Rationale and Purpose of the Module: 1. To develop in the student an understanding of and insight into the management of an insurance organisation in the current economic and legal environment. 2. To examine the nature of the interface between insurance organisations and regulators. 3. To introduce students to the theory and practice of insurance institutions and to acquaint students with the complex and rapidly changing environment within which insurers operate. Stress will be given to the achievement of appreciation of recent developments in the field.

Syllabus: Develop in the student an understanding of and insight into the management of insurance organisations in the current, social, economic and legal environment. Examine the nature of the interface between insurance organisations and regulators. Introduce students to the theory and practice of insurance institutions and to acquaint students with the complex and rapidly changing environment within which insurers operate. Stress will be given to the achievement of appreciation of recent developments in the field.
Prerequisites: IN4003

Economics

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Economics Year 1 Modules

EC4101 - MICROECONOMICS
ECTS Credits: 6 (Year 1 Module)
Economics

Rationale and Purpose of the Module: The primary aim of this module is to introduce students to the fundamentals of modern market-oriented microeconomic analysis. The economic way of thinking introduced in this module involves the use of key concepts and models to help students to begin to understand how a complex real world micro-economy operates. The module should educate students to think in terms of alternatives, help them to understand the cost of individual and firms' choices and provide them with general frameworks to understand key microeconomic concepts and issues. This module aspires to develop the critical thinking abilities of students, not merely through the mastery of microeconomic concepts and techniques but also through a questioning approach to the body of knowledge which is facilitated primarily in the interactive smaller group weekly tutorial sessions and through the use of e-learning platforms.

Syllabus: What is economics is explored. Concepts such as scarcity, individual decision-making, trade-offs and opportunity cost along with distinctions between microeconomics vs macroeconomics and normative vs positive economics are emphasised. Markets are examined. The model of supply and demand is used to understand how market equilibrium prices and quantities are determined. Intervention in the market via price ceilings and price floors are also examined. The sensitivity of demand and supply to changes in key variables such as price and income is analysed through elasticity. Consumer choice using indifference curve analysis is presented. The latter part of the module focuses its attention on supply and costs of production. The different types of costs and how costs affect revenue and profits are examined. A perfectly competitive firms supply decision along with that of Monopoly (single priced vs price discrimination monopolists) are also studied.

EC4111 - MICROECONOMICS (NON-BUSINESS)
ECTS Credits: 6 (Year 1 Module)
Economics

Rationale and Purpose of the Module: The primary aim of this module is to introduce students to the fundamentals of modern market-oriented microeconomic analysis. The economic way of thinking introduced in this module involves the use of key concepts and models to help students to begin to understand how a complex real world micro-economy operates. The module aims to train students to think in terms of alternatives, to understand the cost of individual and firms' choices and provide general frameworks to understand key microeconomic concepts and issues.

Syllabus: The question of what is economics is explored. In answering this question emphasis is placed on the importance of key concepts such as scarcity, individual decision-making, trade-offs and opportunity cost. Students are also introduced to the distinctions between microeconomics vs macroeconomics and normative vs positive economics. Markets as a means of organising economic activity are examined. The model of supply and demand is used to understand how market equilibrium prices and quantities are determined. You not only learn how equilibrium is determined, but how relative prices are used by consumers and suppliers to make decisions about the use of society's scarce resources. Supply and demand curves are used to explain the movements of prices and the allocation of resources in a market economy such as ours. Government intervention in the market via the introduction of price ceilings (maximum price) and price floors (minimum price) are also examined. The sensitivity of demand and supply to changes in key variables such as price and income is analysed through measures of elasticity. Individual decisions are looked at in detail to show how they come together to form the demand curve. Consumer choice using indifference curve analysis is introduced. Shifting the focus back to the market

process the latter part of the module focuses its attention on supply and costs of production. Students examine the different types of costs and how costs affect revenue and profits. Cost concepts and how they relate to a perfectly competitive firms supply decision are examined. At the other end of the competitive spectrum is the complete absence of market competition. This situation of monopoly (single priced vs price discrimination monopolists) is also studied in detail.

Economics Year 2 Modules

EC4213 - INTERMEDIATE ECONOMICS (FOR NON-BUSINESS)

ECTS Credits: 6 (Year 2 Module)

Economics

Rationale and Purpose of the Module: The subject content of this module develops some of the analysis presented in the introductory microeconomics and macroeconomics modules. The concept of market structures and producer and cost theory analysis is extended in the microeconomics section. Pricing of factor inputs is introduced. In terms of the supply-side of the firm, basic optimisation techniques are applied to production theory in dealing with the issue of input mix while cost theory is applied to problems like determining break-even output levels and ômake or breakö decisions. Other sections of the module provide the necessary microeconomic foundation for the analysis of labour markets, basic business problems and pricing of factor inputs. The macroeconomics section incorporates the labour market material into the general Keynesian, Classical model. As outlined below, a variety of topics and policy issues are then examined. The course also discusses issues in international monetary economics including the cost and

Syllabus: The syllabus is divided into a microeconomics and a macroeconomics element. The microeconomics section includes the following topics 1) The theory of production and costs including isoquant and isocost analysis and traditional versus modern theories of costs 2) Models of imperfect competitive market structures and game theory and an analysis of Monopolistic Competition, Oligopoly and Duopolistic market structures 3) Labour demand and supply and 4) Pricing and allocating of the factors of production. The macroeconomics section includes the following topics 5) Irish economics performance before and after 1987 including the reasons for the improvement in economic performance. 6) The labour market including a discussion on how price expectations are formulated and the impact on inflation and unemployment 7) The Keynesian, Classical and Monetarist model. This includes a discussion on the Keynesian model, adaptive expectations and the concept of money illusion. Monetarism. The neo-classical model and rational expectations. The effectiveness of macroeconomic policy under each of he models is addressed here 8)The inflation-unemployment trade-off. Includes an analysis of the Phillips curve and the adjusted Phillips curve as well as deflation, expectations and credibility. 9) EMU and the European Central Bank including a discussion on the costs and benefits of EMU to Ireland. The design of the European Central Bank (ECB). Accountability and transparency. The ECBÆs monetary policy in EMU.

Prerequisites: EC4112, EC4111

EC4004 - ECONOMICS FOR BUSINESS

ECTS Credits: 6 (Year 2 Module)

Economics

Rationale and Purpose of the Module: The purpose of this module is to provide the student with an understanding of intermediate level micro- and macro-economic theory and practice. The first half of the module is concerned with issues affecting the macroeconomy and Irelands membership of European Monetary Union. In the second six weeks of the module students will be exposed to current thinking in economics for business from a micro-economic perspective. In this section of the module students will not only engage with theoretical ideas and constructs but they will also be required to apply the material covered to concrete real-life micro

economic situations. The intention of the module is to develop the students understanding of the nature, scope and functioning of the economy so as to have an appreciation of the changing set of problems business decision-makers face and the economic context in which firms operate.

Syllabus: Section one of the module is concerned with the macroeconomy. The topics covered include: the expectations-augmented Phillips curve, purchasing power parity, interest rate parity and the Fisher effect. These theories are combined to obtain what is known as the "open economy monetary model". This model is then used to evaluate particular issues including the long-run performance of the Irish economy and the factors underlying the 'Celtic Tiger' period. The module continues by extending the analysis of production and cost theory developed in first year microeconomics. Imperfect market structures of the firm are explored including analysis of game theory. Labour market decisions are analysed with respect to the supply and demand for labour and wage determination, the latter forms the key link between the micro and macro sections of the module. An overview of the theoretical and practical exposition of business objectives along with key issues facing the firm in the business environment in addition to the role of government are then explored.

EC4023 - QUANTITATIVE METHODS FOR ECONOMICS

ECTS Credits: 6 (Year 2 Module)

Economics

Rationale and Purpose of the Module: The aim of the module is to introduce a range of basic quantitative skills, concepts and techniques widely used in modern applied work in economics. One of the most important roles of economics is to rigorously identify and quantify economic relationships. Accordingly, this course shows students how to analyse data using quantitative and graphical techniques, and to interpret the results appropriately. This includes the formulation and technical specification of research design, statistical software, results generation and interpretation. Students will acquire comprehensive knowledge and experience of conducting data analysis using Microsoft Excel and statistical software.

Syllabus: This module covers a range of fundamental quantitativetools that are relevant to applied economics. The course begins with a review of linear, quadratic, logarithmic and exponential functions and equations. This is followed by studying the rules of differentiation and optimization applied to economic problems. The full range of topics is listed below. Additionally, the module
will deal with descriptive statistics, data charts and plots; and also will introduce statistical tools, including sampling methods, hypothesis testing and simple linear regression.

Economics Year 3 Modules

EC4417 - INDUSTRIAL ECONOMICS

ECTS Credits: 6 (Year 3 Module)

Economics

Rationale and Purpose of the Module: To study the organisation of markets, firms and industries from both a theoretical and applied perspective. Pricing strategies, concentration, market performance, strategies of firms and of multinational enterprises (MNEs), and Public Policies will all be appraised at the level of the European Union evolving in a globalised context.

Syllabus: 1. Introduction (Scope and Method of Industrial Economics, S-C-P paradigm...).
Theories of the firm: Neoclassical and others
Market Structure
4 . Structure and Strategy (Oligopoly Theory - Cournot and Bertrand duopoly models) 5 . Non-price strategies
6.Technological Innovation
7.Barriers to entry in the case of the EU
8.Performance of firms (performance indicators and performance of EU firms) 9.A Case Study: the EU

Banking Industry 10.Multinational enterprises, globalisation and regionalism
The emerging global 'Asian' firm (keiretsu, Chaebol and Chinese SOE)
EU Policy with regard to industry
Prerequisites: EC4102, EC4101, EC4004

Economics Year 4 Modules

EC4427 - MANAGERIAL ECONOMICS
ECTS Credits: 6 (Year 4 Module)
Economics

Rationale and Purpose of the Module: This module aims to provide students with insights into how economics can aid managerial decision making within firms that operate in an increasingly global environment. Reflecting the highly globalized nature of tastes, production, labour markets, and financial markets in today's world it provides tools for understanding managerial decision making under conditions of certainty and uncertainty (including risk analysis). It examines the nature of the firm in the global economy and different models of corporate governance. It covers economic approaches to decision making on production and cost. It also explores decision making on the demand side of the firm by covering demand estimation and different models of pricing.

Syllabus: The module begins with economic perspectives on the firm including neo-classical, managerial discretion and behavioural models. It also covers property rights and transaction cost perspectives of the firm. It explores how economic theory contributes to a perspective on corporate governance and examines international models of corporate governance. It examines decision making in relation to production using cost and production theory. It proceeds to cover demand-side issues such as demand estimation, demand analysis and pricing. It extends pricing analysis by covering prices under different market structures such as different models of oligopoly. It examines the make or buy decision in the context of the boundaries of the firm and the growing prevalence of outsourcing in a global context. It also examines decision making under conditions of risk and uncertainty.
Prerequisites: EC4101, EC4102, EC4004

EC4027 – EUROPEAN ECONOMY
ECTS Credits: 6 (Year 4 Module)
Economics

Rationale and Purpose of the Module: The years since 1945 have been the longest period since 113 B.C. in which no army has crossed the Rhine with war-like intentions. The very idea of war between the European Union's member States seems as remote as to be nonsensical. The creation of the European Union (EU); a legal, political, economic, cultural, and soon to be a military entity, is one of the greatest economic experiments in the history of Mankind. The shape and scope of the EU has the capacity to affect the lives of hundreds of millions of people in different ways, some positive, some negative. Thus a careful study of this experiment is in order. This module uses economics to understand the history of the EU, its significance in terms of the post 1945 World Economy, the EU's international interactions with the rest of the world, its development up to today, and the prospects for change most likely in the future. This module builds on introductory micro and macroeconomic principles and using economic theory as a lens we will use real world examples, data, and current topics to inform our discussions on the evolution of the European Union.

Syllabus: The module is divided into eight sections set our below. Worksheets corresponding to each topic will aid students revise the module content. Core texts will support lecture material along with references and recommended readings for each topic, where relevant. Topic 1 Introduction to the Course • History of European Integration since the beginning of the 20th century.
Topic 2 Economic Growth in Europe • Growth in Europe: Facts and Figures • Growth effects and factor market integration • Solow's Medium Term Growth Model Topic 3 Trade Theory and the EU • Absolute Advantage •

Comparative Advantage • Production Possibility Frontier
Standard Trade Model • EU Trade Policy • Trade Effects
Tariffs • Quotas • Welfare analysis of trade • Measuring consumers' and producers' surplus in an open economy Topic 4 History and Future of the Common Agricultural Policy Topic 5 History of the General Agreement on Trade and Tariffs and World Trade Organisation • EU and International Trade Agreements • EU Development Policy EU Trade Disputes Topic 6 Environmental Economics • Environmental Policy in the EU • Energy Policy in the EU Topic 7 EU Competition Policy • Theory of Monopoly and Perfect Competition Topic 8 The History of Monetary Integration • The Theory of Economic and Monetary Union • Optimum Currency Area Theory • The European System of Central Banks • The Stability and GrowthPact Euro and the Great Crisis • Banking System and the Future of Euro Area.

EC4307 - ECONOMETRICS

ECTS Credits: 6 (Year 4 Module)

Economics

Rationale and Purpose of the Module: This course provides an introduction to the theory and practice of econometrics, and presents a treatment of econometric principles for cross-sectional and time series data sets. The course concentrates on linear models and focuses on how the techniques can be applied in practice rather than on how their statistical properties can be rigorously derived. The essential purpose of the module is to meet the main empirical research needs of students who typically do not intend to specialise in econometric theory. However, the module also serves as a preparation for students who do wish to proceed to more advanced econometrics courses. Students are expected to have gained experience and show competence in the following transferable skills: data generation, IT (using statistical and econometric software), results interpretation and technical write-up, team-working, directed Web based searches, and use of library resources.

Syllabus: Introduction; regression analysis; method of
Ordinary Least Squares (OLS); the Classical Linear Regression Model; properties of OLS estimators - Gauss- Markov theorem; interval estimation and hypothesis testing; multiple regression analysis; heteroscedasticity; autocorrelation; multicollinearity; dynamic econometric models - autoregressive and distributed-lag models; time series econometrics (including stationarity, unit roots and cointegration). The course makes use of Excel, Microfit 4.1 and Stata data analysis and statistical software.

EC4055 - ENVIRONMENTAL ECONOMICS

ECTS Credits: 6 (Year 3 Module)

Economics

Rationale and Purpose of the Module: This module examines the impact of economic activity on the quality of the natural environment. There is a strong connection between the economy and the environment as production and consumption activities cannot take place without the extraction of resources from the natural world. This module addresses the reasons behind why environmental problems exist and why unregulated markets sometimes fail to protect environmental quality. It also explores potential economic solutions to these problems, which include regulations, taxes, subsidies, and pollution permit trading schemes. This module seeks to provide the student with a balanced and objective analysis of the key environmental issues including climate change, deforestation and overdependence on fossil fuels. It will also equip students with the necessary knowledge to take part in any discussion about environmental policy from an economic perspective.

Syllabus: The nature, scope and key concepts of environmental economics is followed by a discussion on the connection between markets, efficiency and sustainability including the concepts of willingness to pay and demand as well as cost and supply. The next topic examines the optimal level of pollution which is then followed by an analysis of public policy

instruments in the face of market failure. A practical application here is that of EU carbon emissions trading as well as carbon taxes levies by some countries. This is followed by an investigation of the main theoretical and practical issues relating to exhaustible resources (e.g. energy). Issues relating to the extraction of coal, oil and gas are assessed with a special focus on peak oil. In addition, theories on the harvesting of renewable resources with specific application to forestry are developed. The latter part of the module focuses on regional and global air pollutants especially with regard to the effectiveness of the international policy response to the problem of climate change.

EC4437 - INTERNATIONAL POLITICAL ECONOMY

ECTS Credits: 6 (Year 4 Module)

Economics

Rationale and Purpose of the Module: This is an exploration of the relationships between politics and economics in the global political economy (GPE). An understanding of the main issues confronting the global political economy is a pre-requisite to finding solutions to global problems A fundamental assumption is that economic issues significantly influence political decisions and vice versa; it is no longer possible to separate arbitrarily one area of study from the other. The focus of the course falls upon the growth processes in world markets; patterns of global production, international money flows, global and financial investment practices and intensifying regionalism (as evident in the European Union, the North America Free Trade Association and the Asia Pacific Economic Community).This module seeks to provide the student with a balanced and objective analysis of the main issues confronting the world economy and through the use of economic theory, empirical evidence and objective analysis seeks to distinguish between fact and fiction.

Syllabus: The module will have as its main objective an exploration of the main issues that confront the world economy. Topic 1: Forces Shaping the World Economy Topic 2: North South Issues: Trade Policy and Economic Development Topic 3: International Monetary System 1948- present: International Currency Flows and the Role of International Institutions Topic 4: International Trade and Growth Topic 5: Globalisation and Foreign Direct Investment Topic 6: Multinational Corporations and the Changing Nature of International Production Topic 7: Environment, Sustainability and the Global Economy: Climate Change and effectiveness of global policy responses Topic 8: Economic Development, Poverty and the Environment Topic 9: The Global Financial and fiscal crises in the world economy and in Ireland. Topic 10: Current and Future Economic Challenges for the World Economy.

Prerequisites: EC4101 , EC4111 , EC4102 , EC4112

Management & Marketing

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Management & Marketing

Year 1 Modules

MI4007 - BUSINESS INFORMATION MANAGEMENT

ECTS Credits: 6 (Year 1 Module)

Management and Marketing

Rationale and Purpose of the Module: To illustrate the implications of viewing the organization as an information processing entity

To enable students to create and manipulate data and information for managerial reporting.

To highlight the social and economic theories underlying the development and use of information and knowledge in modern business.

To make students aware of the challenges of the opportunities and challenges of information in a global context.

Syllabus: This course will introduce the student to information as a corporate resource; to the firm as an

information processing entity; to the types of business systems platforms in support of-managerial and executive-level decision making and the coordination of business processes. It will show information management in the functional areas of business: accounting, marketing, human resources, operation. It will provide an economic and social framework for understanding the nature and interaction of information, technology, people, and organizational components; the role of the Internet and networking technology in modern organization; the evolution of e-business and the transformation of organizations and markets; business systems as both constraining and enabling organizations; the relationship between business systems and an organizations social structure; information and knowledge as a strategic resource in organizations.

MI4407 - SOCIAL AND ECONOMIC PERSPECTIVES OF INFORMATION MANAGEMENT

ECTS Credits: 6 Year 1 Module)

Management and Marketing

Rationale and Purpose of the Module: To develop a view of the organization as an economic and social structure in the context of information management Formulate a social context for the development and exchange of information within organizations The understand the economics of information processing across organizations and markets

Syllabus: Provide a social and economic framework for understanding the nature and interaction of information, technology, people and organizational components. explain how information systems constrain and enable organizations. organizational structures and information systems. the characteristics of the information economy using structuration theory and institutional economics. The role of power, politics ,social interactions, cultural and intercultural issues in understanding the implementation of business systems. the role of the Internet and networking technologies in modern organizations. The evolution of e-business and its transformation of organizations and markets. the cost structure of information systems. These concepts will be reinforces and developed through the use of managerial and executive level information systems, internet technologies and collaborative software. Prerequisites: MI4305

MN4007 - PROJECT MANAGEMENT THEORY AND

PRACTICE

ECTS Credits: 6 (Year 1 Module)

Management and Marketing

Rationale and Purpose of the Module: The primary objective of this module is to provide students with the knowledge, skills and understanding necessary to apply Project Management principles, tools and techniques to help initiate changes to achieve specific pre-determined project objectives in line with organisational goals and strategies. The module will prepare students for the workplace by developing their understanding of

Project Management knowledge areas and Project Management processes. The student will benefit from understanding how projects are initiated, implemented, monitored and controlled and closed within a change environment.

Syllabus: Project management organizational strategy and change, project portfolio management, programme management, project lifecycles, project processes,
project management strategies and approaches, projects, operations and change, project human resource management, role of the project manager-change agent, project leadership, role of the project team, projects and organisational structures, implementing change though
project initiation, project selection, project integration management and project implementation. Developing the project charter, developing the project plan, project communications management, project risk management, project scope management, project estimates, top down estimating, bottom up estimating, project budgets and project baselines, project time management, activity scheduling, resource allocation, project monitoring and control, earned value - monitoring change, cost and schedule variance, cost and schedule performance indices, project change management, project quality management, project computer applications, project closure.

BS4001 - PRINCIPLES OF INTERNATIONAL BUSINESS
ECTS Credits: 6 (Year 1 Module)
Management and Marketing

Rationale and Purpose of the Module: This module aims to provide students with an understanding of the international dimensions of business. It provides students with a foundation in the theory and practice of businesses operating within a globalised context. The module introduces students to the extensive remit of international business activity and to key concepts concerning companies operating internationally.

Syllabus: The course will introduce topics concerning international business while illustrating its scope and importance. Topics will include the impact of geography, culture and politics on business dealings. Students will study formal institutions (economic and political) and informal factors such as culture, religion, language and ethics. Other topics may include: globalization; international trade; corporate social responsibility; global branding; international management strategy.

Management & Marketing Year 2 Module

CM4203 - COMMUNICATIONS
ECTS Credits: 6 (Year 2 Module)
Management and Marketing

Rationale and Purpose of the Module: This module facilitates students in thinking strategically about communication. It aids them in improving their written, presentation and interpersonal communication skills. The module examines a set of 'best practices' or guidelines that have been derived from both research and experience. It gives students the opportunity to put those guidelines into practice and encourages them to reflect on the role of communication in personal, academic and business contexts.

Syllabus: This module introduces Communications in personal, academic and professional contexts. Students are introduced to communication theory and develop their practical communication skills. Topics covered include the following: the communication process; culture and intercultural communication; interpersonal communication including listening and feedback skills; understanding conflict and its impact on communication; referencing and library skills; non-

verbal communication; presentation skills; communication channels, contexts, strategies and audiences.

MK4603 – MARKETING
ECTS Credits: 6 (Year 2 Module)
Management and Marketing

Rationale and Purpose of the Module: The purpose of this module is to introduce students to marketing as a business philosophy and as a management function and to examine the role of marketing in contemporary organisations. This focuses on the need to understand and connect with customers and to develop and deliver products and services that customers value.

Syllabus: Marketing scope; marketing concept; marketing internal and external environment; understanding customer behaviour; segmentation, targeting and positioning; product and brand management; marketing communications; pricing; distribution; marketing of services; marketing and corporate social responsibility.

Management & Marketing

Year 3 Modules

EP4005 - NEW ENTERPRISE CREATION
ECTS Credits: 6 (Year 3 Module)
Management and Marketing

Rationale and Purpose of the Module: Small firms are a critical component of the Irish economy and play key roles in the stimulation and development of all economies. In recent years high-profile success of both Irish and international entrepreneurs in building profitable business has been inspiring. Creating a new
enterprise isa challenging task, one that requires specific knowledge as well as general business and entrepreneurial skills. Successful entrepreneurship and the transformation of creative ideas into commercially viable businesses requires more than merely luck and money. It is a cohesive process of creativity, risk taking and business planning. This module will expose students to the process of entrepreneurship and more specifically to the process of opportunity recognition, the elements of business planning and provides hands-on experience in the creation and development of a new business enterprise. Students will apply the knowledge they learn in the classroom to real-world business opportunities and subsequently will develop a more entrepreneurial mindset.

Syllabus: The aim of this module is to provide students with an understanding of the stages involved in creating new venture, including the development of skills in evaluating, preparing and presenting a business plan. It will provide an entrepreneurial mindset and a sense of entrepreneurial behaviour, which can be effectively used in a number of different work environments. The module will facilitate students in the development and application of the analytical and decision-making skills necessary in formulating, implementing and controlling a business plan. The module will also establish project credibility and improve students' presentation and communication skills. The module will therefore address the following: ; the importance of SMEs and business planning bull; developing and screening business ideas • feasibility analysis bull; components of the business plan • financing options for the business • presenting the business plan with confidence

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MG4035 - INTERNATIONAL MANAGEMENT
ECTS Credits: 6 (Year 3 Module)
Management and Marketing

Rationale and Purpose of the Module: The rationale for this module is to provide students with

a thorough appreciation of managing organisations internationally, along with an understanding of the different trajectories of current International Management thinking. The module is dedicated to answering four core questions which focus on developing skills for operating in an international environment.

1). What is international management and what complexities arising when operating at the international level? How do we understand differences between countries when managing internationally, and what are the implications of these differences for international managers? What is the most appropriate way for firms to internationalise, and to manage and structure their activities? How can we develop the managerial talents and capabilities to ensure that managers can be a success internationally.

Syllabus: Introduction to International Management- definitions and key concepts; Country Competitiveness, Globalisation & the MNC; Political and Legal

Determinants of International Management; Cultural Determinants of International Management and cross cultural perspectives of management practice, convergence, divergence and cross vergence; Firm Internationalization - Entry Strategies, Structures and the role of alliances and joint ventures; Global Leadership competences; International Assignment Cycle and repatriation.

MG4045 - CHANGE MANAGEMENT

ECTS Credits: 6 (Year 3 Module)

Management and Marketing

Rationale and Purpose of the Module: 1. To enable students to gain a deeper understanding of organisational reality through the different levels and perspectives of change inside and outside the organisation. To develop a deep appreciation of the inter-relationship between routines and change in terms of structure, culture management intervention and modes of reinforcement. To actively engage students to develop skills in proven approaches to managing change and crises in both for-profit and not-for-profit organisations. To enable students to gain a deeper understanding of the challenges and complexity of international change management. To give students a deep appreciation of the organisational and environmental roadmap of change.

Syllabus: Nature of organizational change, resistance to change, understanding attitudes and behaviours towards change, managerial skills of change agents, problems

facing change agents, levels of organizational change, formation of implementation paths, mobilizing for change, change levers and interventions, strategic change frameworks, monitoring, control and resourcing change, evaluating change, crisis management, management of stakeholders in change and crisis management.

MK4035 - MARKETING RESEARCH

ECTS Credits: 6 (Year 3 Module)

Management and Marketing

Rationale and Purpose of the Module: The module specifically focuses upon the development of applied research skills which are fundamental to understanding and undertaking marketing activities. The purpose of the module is: To expose students to different methodologies used by marketers. To develop marketing research skills that can be applied to a range of marketing contexts (e.g. sales, advertising, NPD, customer satisfaction). * To equip students with the skills necessary to; develop research instruments, conduct fieldwork and data analysis/interpretation and present research findings. To encourage and support effective teamwork and project management. The module is thus designed to enhance students' applied skills (and integration of theory and practice) before they embark on their coop placement. To promote critical reflection on the nature of information, the integrity of it and the application of a systematic and disciplined approach to information gathering.

Syllabus: The marketing research skills will be fostered through management of an extensive

student project: Developing research objectives (e.g. problem definition); Research design and creation of a research proposal;
Consideration of the ethical implications of the research;
Collection, analysis and interpretation of secondary data; Collection, analysis and interpretation of primary data; Research presentation.
Prerequisites: MK4002

MK4045 - DIGITAL MARKETING
ECTS Credits: 6 (Year 3 Module)
Management and Marketing

Rationale and Purpose of the Module: Digital marketing platforms have changed how businesses connect and communicate with customers. The technology now available to consumers has radically altered their consumption patterns. These new behaviour patterns have created significant challenges and opportunities for marketers. This module gives a background of the rapidly changing marketing practice within the context of digital marketing and online social networks. Students will understand the magnitude of digital and social media and how to apply it to within Business-to-Consumer (B2C) and Business-to-Business (B2B) markets. Students will learn about cutting-edge digital marketing concepts, techniques and strategies used within industry. Furthermore students will understand how to leverage mobile and location-based technology for marketing purposes. After this module, from a practical perspective the student will be capable of developing and managing digital marketing campaigns.

Syllabus: Introduction to Digital Marketing Theory; Consumer Behaviour and Digital Media; Online Identities; Evolution of Digital Marketing Landscape; Understanding Business-to-Consumer (B2C) and Business-to-Business (B2B) marketing in this new landscape; Social Media & Content Marketing Platforms (Social Networks, Discussion Boards, Blogging, Micro-Blogging, Widgets, Crowd Sourced Content, Social Curation, Social Marketplaces, Wikis, Social Bookmarking); Search Engine Marketing; PPC Advertising; Search Engine Optimisation; Email Marketing Campaigns; Website Analytics; Building a Digital Brand; Typologies of Online Brands; Digital Products & Freemium Business Model; Online Communities Creation and Curation; User Generated Content & Co-Creation; Mobile and Location-based Marketing; Content Marketing Development, Online PR & Reputation Management; Planning a Social Media Campaign; Impact of Gamification; Word of Mouth and Viral Marketing; Social Media Metrics; Monitoring, Measuring and Management of Social Media Campaigns; Omni-channel - Integration of Digital Marketing with Traditional Marketing Activities; Digital Privacy and Protection; Ethical Digital Marketing Practice, Trends in Digital Marketing.

Management & Marketing

Year 4 Modules

MK4027 - STRATEGIC BRAND MANAGEMENT
ECTS Credits: 6 (Year 4 Module)
Management and Marketing

Rationale and Purpose of the Module: The purpose of this module is to equip students with the fundamental concepts and theories of strategic brand management and enable them to critically engage with and apply key brand management theories and strategies to a range of relevant sectors and contexts. This level 8 marketing module provides students with specialised strategic brand management knowledge and skills, while engaging students in a range of current branding issues including the role of ethics and CSR and global branding.

Syllabus: The module firstly presents the history and origin of branding before focusing on brand building theories and models. It then explores the nature and role of brand image and corporate identity and corporate brand management. Brand equity from a consumer and financial perspective is introduced and compared. Brand building strategies are explored in a range of contexts including

services, retailing, B2B and online. Strategic brand building is explored with strong emphasis on developing valuable, sustainable and ethical brands and managing successful brands in an increasingly globalised and digitalised context.

Prerequisites: MK4002

EP4007 - ENTERPRISE MANAGEMENT AND GROWTH

ECTS Credits: 6 (Year 4 Module)

EP4007 and EP4407 are co-scheduled

Management and Marketing

Rationale and Purpose of the Module: How best to scale up and expand the small enterprise into international markets are key managerial challenges facing the owner-manager and if not accomplished effectively can lead to the demise of a potentially successful business. When managed successfully, it provides interesting, creative, and rewarding experiences for the owner-manager. In the small enterprise context, there is a constant pressure to create and sustain a competitive advantage and to achieve this, the owner-manager needs to become sophisticated in their management practices and strategic thinking. This requires the owner-manager to move from the "entrepreneurial" to "professional" manager and leadership roles. This module will provide students with a strong theoretical knowledge of the challenges of managing a new and growing enterprise with an international perspective and will develop their skills and competencies to apply and integrate this knowledge to the realities of small enterprises.

Syllabus: The aim of the module is to provide students with an understanding of components of management and the process of strategy development to achieve firm growth and the creation of a competitive advantage in international markets. The module will develop a critical awareness and a detailed understanding of the challenges facing the entrepreneur/owner manager as they manage and grow their enterprise. The content will explore a range of classical and contemporary theories around enterprise management and the challenges and difficulties in implementing these in the growing enterprise. It will provide students with an understanding of the components of and the process of strategy development, implementation and evaluation by reviewing the various growth strategies available to the owner-manager to achieve international growth.

EP4407 - ENTERPRISE DEVELOPMENT

ECTS Credits: 6 (Year 4 Module)

EP4007 and EP4407 are co-scheduled

Management and Marketing

Rationale and Purpose of the Module: Creating a new venture is a challenging task, one that requires specific technical and business knowledge as well as general business and entrepreneurial skills and competencies. The aim of this module is to introduce students to the stages involved in the establishment and management of a new business. This includes opportunity recognition, analysis of market potential, the analysis and acquisition of resources required to capture market opportunities and the launch of a new business. In addition the module content explores the backgrounds, motivations, characteristics and skills of enterprising individuals. On completion of the module the student will have a better understanding of the issues involved in forming a business enterprise. The module will serve as a strong foundation for those aspiring to own and operate their own business.

Syllabus: The module will address the following topics- Understanding the role and importance of the small firm sector to the Irish economy. The entrepreneur/owner/manager characteristics and classifications; identification and evaluation of business opportunities; product/service development; market research; industry analysis; market/sales strategies; management structure; manufacturing/operations; sources of start-up finance; financial projections (projected cashflow, profit and loss and balance sheet); managing the

new business (people and process management) and exit strategies for a new business.

Work & Employment Studies

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Work & Employment Studies Year 2 Modules

PM4013 - PRINCIPLES OF HUMAN RESOURCE MANAGEMENT
ECTS Credits: 6 (Year 2 Module)
Work & Employment Studies

Rationale and Purpose of the Module: This module examines both the role of the HR function in the management of people at work and the importance of managing people in contributing to organisational effectiveness. This module is designed to provide students with an appreciation and understanding of Human Resource Management (HRM) in organisations. There is a strong focus on contextualising HRM within the prevailing macro environment, to demonstrate how this influences the range of HR policies and systems enacted by organisations. The syllabus covers core issues surrounding managing people at work. In so doing, the module starts with a consideration of key labour market issues in Ireland and how these affect the nature of HRM in organisations. Core HR activities are next explored including the processes of human resource planning, recruitment and selection. The module then examines critical elements of managing and rewarding performance, career development, and developing people at work. The nature of work is set down and finally, the link between CSR and HRM is highlighted.

Syllabus: The syllabus covers core issues surrounding managing people at work. In so doing, the module starts with a consideration of key labour market issues in Ireland and how these affect the nature of HRM in organisations. Arising from a labour market analysis, core HR activities are next explored including the processes of human resource planning, recruitment and selection. The module next examines critical elements of managing and rewarding performance, designing jobs and developing people at work. The nature of work is set down and finally, the regulatory environment for HRM in Ireland is indicated.

PM4603 - EMPLOYEE RELATIONS FOR ENGINEERING AND SCIENCE
ECTS Credits: 6 (Year 2 Module)
Work & Employment Studies

Rationale and Purpose of the Module: Enable students to understand the nature of employees relations at work.
Demonstrate familiarity with approaches to managing and motivating employees.
Identify the role and functions of trade unions and employer organizations.
Identify the appreciation of the role of the state in employee relations and in particular the role of the labour court. Promote a clear understanding of the legal nature of the contract of employment, and. Provide an overview of the implications of employment law for the management of the employment relationship. Review the provisions of dismissals, equality, health & safety and other employment legislation. Allow students to appreciate the role of national and workplace level partnership.

Syllabus: The employment relationship; perspectives on the business enterprise; the individual and work groups; the basics of recruitment and selection; motivation techniques; job design; worker participation; team work and its development; effective supervisory management; discipline and grievance administration; communication in employee relations; management trade unions shop stewards; pay bargaining and negotiation; conflict and its management; the labour court and the labour relations commission; employment law û the contract of employment; unfair dismissal, equality, health and safety their implications for the conduct of employee relations.

Work & Employment Studies Year 3 Modules

PM4035 - THE PSYCHOLOGY OF WORK
ECTS Credits: 6 (Year 3 Module)
Work & Employment Studies

Rationale and Purpose of the Module: The module aims to enable students develop knowledge and skills in psychology (both as a discipline and as a professional field) applied to work and organisations. It aims to develop knowledge and skills of understanding individuals in context, considering cognitive, emotional, motivational and behavioural responses to varying working environments and contexts.
It aims to develop theoretical and applied knowledge about key psychological concepts and theories concerning, work, the workplace, and working life.

Syllabus: 1 Introduction to Work & Organizational Psychology: Psychology as a Science: The art of thinking critically in an applied field 2 Studying Individuals at Work Context & Behaviour Cognition Motivation Emotion 3.Taking an Active Approach to Work Active Behaviour: Adaptive and proactive behaviour Proactive motivation Proactive cognition Actively managing emotions at work 4.Staying Healthy at Work Health Cognitions: Thinking Healthy Emotions: Coping with work stress Behaviour: Fatigue & recovery Motivation: Work engagement Environment: Job Demands & Job Control 5.Staying Positive at Work What is positive psychology? Behaviour: Flourishing Environments conducive to human flourishing Motivation: Psychological Capital Positive Emotions & the ability to savor Cognition: Positive Thinking (mindfulness) 6.Creativity and Innovation at Work Behaviour: Creative and innovative behaviour Cognition: Creative problem solving Motivating employees to be creative: Flow Creative emotions: Broaden & Build

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PM4055 - CRITICAL PERSPECTIVES ON EMPLOYMENT RELATIONS
ECTS Credits: 6 (Year 3 Module)
This module is based on Income Tax in Ireland. Therefore, it is not applicable elsewhere

Work & Employment Studies

Rationale and Purpose of the Module: To provide an overview of the evolution and contemporary nature of employment relations, with specific focus on Ireland.
To ensure students are cognisant of the various theoretical perspectives on employment relations.
To enable students to understand and analyse workplace mechanisms for employee voice. To enable students to analyse case studies on employment relations and to develop report writing skills. To understand the role and behaviour of various actors in employment relations.
To understand employment relations in an international and comparative context.

Syllabus: Theoretical perspectives on employment relations - unitarism, pluralism, and radical theories. International and comparative employment relations. Employee voice - involvement and participation, collective bargaining, non-union firms. The actors and employment relations - trade unions and employment relations, management approaches to employment relations, state approaches to employment relations.

Work & Employment Studies Year 4 Modules

PM4017 - HUMAN RESOURCE PRACTICE
ECTS Credits: 6 (Year 4 Module)
Work & Employment Studies

Rationale and Purpose of the Module: This purpose of this module is to develop practical skills/capabilities considered essential for HR practitioners. These skillsare primarily in the key areas of selection, appraisal, discipline and grievance and applying regulations governing HR to

all processes and activities. Another core purpose of the module is to increase the knowledge
and skill and overall capability of the participants in key operational areas of HR such as performance management, health and safety, employment regulation, employee welfare issues.

Syllabus: Overview of key HR processes; key operational areas: selection, performance management conflict. key regulatory considerations; Key communication skills revisited- active listening, questioning styles, recording information; job analysis; recruitment process- designing job descriptions, person specifications, ; sourcing applicants, interacting with recruitment agencies, application forms; evaluative standards for selection methods: reliability, validity, practicality, integration, interpretability; selection methods: references; selection process- short listing, designing matrices, designing interview assessments, interviewing techniques, applying appropriate communication skills to selection interview; individual characteristics and bias; preparing and setting up interview; regulatory considerations, documentation; performance review- preparation, documentation, conducting the performance review, follow up; workplace counselling; disciplinary interviewing.
Prerequisites: PM4013

PM4027 - SOCIAL PSYCHOLOGY OF ORGANISATIONS
ECTS Credits: 6 (Year 4 Module)
Work & Employment Studies

Rationale and Purpose of the Module: This Module seeks to present a broad introduction to social psychology, the scientific study of human social influence and interaction. It provides basic exposure to social psychological issues using the organisation as an operational paradigm for generating understanding and insight. Perspectives from social psychology are drawn upon to examine aspects of contemporary social and organisational life. This module aims to give a critical understanding of current social psychology research and develop a reflective understanding of key organisational developments. At the end of the module students should have a sound knowledge of research in social psychology in the organisational context and will be expected to be able to apply these ideas, and use them to understand and address relevant social issues.

Syllabus: The Nature and History of Social Psychology; Approaches to the Study of Social psychology; Personal and Social Identity in Workplaces; Self-awareness and Self-regulation; Social influence, Conformity, Compliance and Obedience; Helping Behaviours and Organisational Citizenship, Pro-social, Anti-social and Withdrawal Behaviour; The Role of Attribution and Cognitive Dissonance in Organisational Decision-making; Stereotyping and Prejudice in Employment and Workplace Interactions.
Prerequisites: PM4022

Faculty of Science & Engineering

UNIVERSITY OF

Biological Sciences

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Faculty of Science and Engineering

Biological Sciences Year 1 Modules

EQ4051 - INTRODUCTION TO HORSEMANSHIP

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Restrictions: Equine experience resume required

Biological Sciences

Rationale and Purpose of the Module: The purpose of this module is provide the students with the basic understanding of horsemanship, a foundation level of knowledge and practical skill in working with the horse in a safe manner, to highest industry standards.

Syllabus: Safety around the horse in all working environments; health and safety legislation, best safety practice, individual responsibility for recognising and minimising risk, equine behavioural bases of established safety practice. Gaits and movement; analysis of basic gaits, effect of equipment and the rider on the qualitative and quantitative aspects of movement. Horse management: basic methods of management for horses stabled, at grass and at competition, simple health indicators. Tack and equipment; recognition and application of simple commonly used items, principles of design and function, physiological and psychological effect on the horse. Rider/trainer capacities; proprioception, communication, simple work from the ground and ridden, simple methodologies of horse training.

EV4012 - EQUINE ANATOMY AND PHYSIOLOGY

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Biological Sciences

Rationale and Purpose of the Module: To introduce students to fundamental concepts of Equine Anatomy and Physiology.

Syllabus: The anatomy of the horse] to be discussed with reference to musculoskeletal structure and organs.

[The main systems of the horse; digestive, respiratory, circulatory (including lymphatics); reproductive (including embryology and physiology of reproduction); urinary; nervous and immune]. [Consideration of the theoretical background to the use and operation of modern diagnostic/treatment equipment] such as X-ray, ECG, ultrasound, laser and fibre optic-based devices.

ER4011 - INTRODUCTION TO ENVIRONMENTAL& BIOSCIENCES

ECTS Credits: 3 (Year 1 Module)

Chemical Sciences

Rationale and Purpose of the Module: Environmental and Biosciences are broad interdisciplinary subject areas.

It is important that first year students, entering through the common science intake programme, gain a useful understanding and knowledge of the scope of these subject areas to effectively ensure that they can make appropriate choices at the end of their first year in UL. This module provides an overview of the broad areas and current topics within both the bioscience and environmental science areas.

Syllabus: Sustainable development; environmental impact assessment; ecosystems and functioning: fossil fuels and the environment; water and air pollution; waste management. Topics in Biosciences include: development in cancer therapies; new immunotherapies; understanding cell communications; the human condition - us and our microbes.

Prerequisites: CH4701, CH4711, CH4721, BY4001

FT4421 - INTRODUCTORY FOOD SCIENCE AND HEALTH

ECTS Credits: 6 (Year 1 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: To provide an introductory course in food science and technology, highlighting the linkages between food and health.
To highlight factors affecting food quality, safety and nutrition.

Syllabus: General overview of Food Science and its relationship to human health. Brief introduction to basic food components. Introduction to the scientific principles underpinning food production, preservation and packaging. Control systems to ensure food safety
and quality e.g. Hazard Analysis Critical Control Point (HACCP). Impact of food processing technologies on health and nutrition, safety and quality. Introduction to the chemistry of nutritional and anti-nutritional components relevant to human health e.g. Malliard-browning reactions, protein degradation, lipid oxidation. Food and health issues of consumer concern including bovine spongiform encephalitis (BSE), genetically modified foods, E. coli 0157:H7.

Biological Sciences Year 2 Modules

BY4013 - GENERAL MICROBIOLOGY

ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited places available: 5
Biological Sciences

Rationale and Purpose of the Module: This course aims to provide students with an introduction to the subject of Microbiology and presents ways in which fundamental principles are put into practice and the special skills and techniques needed for safe laboratory work.

Syllabus: The syllabus is comprised of the following topics, microbial structure and function: microbial growth; nutrition; identification and enumeration; applied aspects of microbiology and microbial ecology: microbiology of water; medical microbiology: disease and pathogenesis; food microbiology; preservation and spoilage; some traditional and novel processes in industrial microbiology; microbes and biotechnology. This course will cover fundamental aspects of the structure, growth, replication and significance of major groups of bacteria and viruses. Nutritional and physical requirements for growth, propagation and measurement of growth as well as procedures for killing microbes will be dealt with. Students will be introduced to the significance of microbiology to industry and disease. In practical sessions students will learn aseptic technique, basic skills in handling, culture and isolation of bacteria, routine growth, replication and significance of major groups of bacteria and viruses.
Prerequisites: BY4001

EQ4013 - FOUNDATIONS OF EQUINE LOCOMOTION

ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Restrictions: Equine experience resume required
Biological Sciences

Rationale and Purpose of the Module: The module provides students with the knowledge on the principles of athletic movement in the horse, which includes simple gait evaluation and consideration of various factors that impinge on efficient movement / locomotion. The module also develops a greater understanding of the physical preparations necessary for performance and the use of effective practices pre and post exercise. These are key skills in industry to prevent and recognise injury and maximise performance in race and sport horses.

Syllabus: Locomotion; the role of nervous, skeletal and muscular systems in locomotion, use of body segments - head and neck, back and ribs, hindquarters, ring of locomotion, limiting factors - joint range of movement, injury, willingness, opposing muscle groups, stance and flight phases of movement, simple gaits - walk, trot, canter, gallop. Common misconceptions in equine movement.

Qualitative and quantitative analysis of equine movement, comparison with competition requirements, locomotion and soundness. Common simple gait abnormalities; lateral and medial deviation, skeletal foundations of gait abnormality, farriery and gait abnormality. Video analysis of simple gait abnormality.

EV4003 - EQUINE FEEDING AND BEHAVIOUR
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Biological Sciences

Rationale and Purpose of the Module: To understand the basic principles of nutrition and the practical aspects of feeding. To understand normal patterns of equine behaviour and the identification of behavioural problems.

Syllabus: Digestive anatomy of the horse; Feedstuffs and forages in the horse's diet; Diet formulation and nutrient requirements for horses; Feed composition; Feeding management; Bodyweight and Condition Scoring; Ethology and ethograms; Effects of domestication on behaviour; Learning Theory, Normal and abnormal equine behaviour; Environmental effects on behaviour; Causation, function, ontogeny of equine behaviours; Horses as herd animals; Behaviour in the wild; Normal and abnormal equine behaviour; Environmental effects on behaviour; how the horse learns; stereotypic behaviours; causes of abnormal and other undesirable behaviours; Behaviour as an indicator of welfare.

EV4023 - EQUINE HEALTH AND ENVIRONMENTAL MANAGEMENT
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Biological Sciences

Rationale and Purpose of the Module: The purpose of this module is to give students an understanding of the concept of 'dis-ease' as a departure from health and the multifactorial nature of disease pathogenesis. The module provides basic information on the individual components (host, disease agent and environment) and a perspective on the interactions of these components (the disease triad) in determining the outcome for the host.

Syllabus: The causes and effects of infectious and non-infectious agents on the health of the horse; the Disease Triad and the multifactorial nature of disease; overview of bacterial and viral diseases affecting the horse; environmental requirements of the stabled horse and the role of the environment as a pre-disposing factor to disease in the horse, vis a vis ventilation, temperature, dust and waste; Heat and moisture balance; Dust Control in Animal Production Buildings; Ventilation Systems; Temperature Regulation; Effects of Environment on Various Body Systems; Management of the Environment to optimise animal health.

BY4215 - SOIL SCIENCE
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited places available: 5
Biological Sciences

Rationale and Purpose of the Module: The purpose of the module is to educate students about the nature, properties and functions of soils with particular reference to soils in Ireland.

Syllabus: 1. Introduction:
Physical properties of soil:
Mineral matter, organic matter, water and air in soil, structure, structural stability and measurement of these, soil water and water movement, soil air, soil temperature. Soil chemistry: Soil colloids, cation exchange, soil pH 4. Soils and plant nutrition: Nutrient elements, soil testing, availability of elements, soil pH and liming, calcium, magnesium , sulphur and trace elements 5. Soil biology: Soil organisms, soil organic matter, C:N ratio 6. Soil genesis and classification (these 5 lectures not taken by Equine Science, who transfer to crop and grassland instead for grassland): Factors in soil

formation, soil formation in Ireland, soil profiles and horizons, classification and mapping of Irish soils, Great soil groups, series and types, Great soil groups found in Ireland, County soil maps, soils and land use. Functions of compost, compost materials and growth substrates, making an organic compost. Nutrient requirements and deficiencies in horticultural plants & use of artificial and organic fertilisers. Laboratory:
Preparing a compost for seeds and a blocking compost
Preparing a compost for actively growing plants
Preparing cuttings composts.

BY4033 – CORE CONCEPTS IN BIOSCIENCE
ECTS Credits: 6 (Year 2 Module)
Biological Sciences

Rationale and Purpose of the Module: The core concepts of life: reproduction, adaption, growth and homeostasis underpin all biological science disciplines. The goal of this module is to build on the foundations of Year 1 to develop deeper understanding of the milestone scientific achievements that have shaped modern bioscience. The module will present Nobel Prize winning scientific advances in fields of biochemistry, physiology, neuroscience, immunology, microbiology, cell biology and cancer. Students will research one of these topics and prepare a presentation and a technical and lay summary. On completion of the module students will have gained significant insight into the many disciplines that encompass modern bioscience and have attained practical research and communication skills that will be essential for their success in the Bioscience programme.

Syllabus: This module will examine key scientific achievements in the field of bioscience. Nobel prize winning discoveries in the fields of Physiology/Medicine/Chemistry will be presented. This includes: MHC and transplantation, TLR and Dendritic cells, complement pathway, cancer immunotherapy, HIV and Hepatitis C virus, and Cell cycle, CRISPR, neuronal transmission. The content of the lectures will be revised and updated as new developments occur.

BY4015 - PLANT PHYSIOLOGY
ECTS Credits: 6 (Year 2 Module)
Limited places available: 5
Biological Sciences

Rationale and Purpose of the Module: To introduce the students to the principles and applications of plant physiology.

Syllabus: Plant mineral nutrition, nutrient deficiencies and fertiliser use. Nitrogen and secondary plant metabolism. Types and structures of mycorrhizas and their roles in plant nutrition. Saprotrophy, parasitism and carnivory in plants. Water relations in plants. Plant hormones, roles and their applications: plants responses, root and shoot growth, tissue differentiation, photoperiodic responses in plants, photomorphogenesis, flowering. Seed dispersal, dormancy and germination. Tropisms and plant movement. Applications in horticulture and agriculture. Plant reproduction and pollination ecology; interactions with animals. Phytopathology; fungal pathogens of plants and plant defence mechanisms, phytoalexins, allelopathy. Photosynthesis, C3, C4 and crassullacean. Acid metabolism; photorespiration and plant metabolism. Plant growth measurement. Biological/ecological relationships between plants and other organisms. Plants and medicines, ethnobotany. Pedagogical approaches to teaching plant physiology at second- level
Prerequisites: BY4002

BY4055 - ANIMAL FEEDING AND DIGESTION
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Biological Sciences

Rationale and Purpose of the Module: The purpose of the module is to provided students of the B.Sc (Education) in Biological Science, Agricultural Science elective with an introduction to the principles of feeding and nutrition in farm animals.

Syllabus: Carbohydrates, protein and fats classification and sources; ruminant and non-ruminant digestion and fermentation; VFA production; feedstuffs and their classification, feed processing and benefits; forages for farm animals; assessment of forage and feed quality; minerals and vitamins in the animal's diet; energy, protein and amino acid requirements and sources; diet formulation; algebraic calculations and Pearson Square methods; feeding management; feeding for maintenance; feeding during pregnancy and lactation. Feeding the growing animal and average daily gain; condition scoring, forage to concentrate ratios.

Biological Sciences Year 3 Modules

EQ4025 - THE YOUNG HORSE
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Restrictions: Equine experience resume required
Biological Sciences

Rationale and Purpose of the Module: The module provides the students with the skill to examine the physical and mental pre-requisites for training the young horse, which includes the evaluation of young horse conformation, maturity and developmental stage of the horse ready to begin training. Additionally, it aims to develop the students ability to critically evaluate different training approaches and techniques commonly used in industry in the context of horse behaviour, welfare and learning ability, which are critical skills necessary to evaluate the effectiveness and ethics of standard industry practices currently in use.

Syllabus: Conformation and suitability; indicators of maturity, estimation of maturity, suitability for purpose, muscular development. Training the young horse; behavioural bases, alternative approaches, developing understanding of and obedience to simple cues, timing of initial training by discipline and maturity, commonly used approaches for sport horses and racehorses, establishing trust and confidence, improving balance and strength, developing athletic technique on the flat and jumping both loose and on the lunge, accustoming the horse to the rider early riding of the young horse. Equipment; lungeing and longreining equipment, side reins, De Gouge, Chambon, training aid systems, mouth
examination and bitting for the young horse, use of a mounted dummy for rider introduction.

BY4025 - CROP AND GRASSLAND SCIENCE
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited places available: 5
Biological Sciences

Rationale and Purpose of the Module: Climate in Ireland, climate and plant growth, agricultural policy Fruits crops, protected crops, horticultural pests, weeds and diseases, integrated crop production. Landscape management. Fertilisers and manures; tillage machinery; cultivation, management and harvesting of arable crops and root crops; farm forestry; energy crops; grassland establishment and management; agriculture and the environment.

BY4045 - CELL BIOLOGY AND BIOCHEMISTRY
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited places available: 5
Biological Sciences

Rationale and Purpose of the Module: To provide a solid understanding and knowledge of fundamental biochemical processes which will underpin an understanding of nutrition, metabolism and exercise physiology.

Syllabus: The course is delivered as a series of lectures covering the following topics: Carbohydrates; Lipids; Amino acids; Protein; Nucleic acids; Enzymes; Membranes; Muscles;

Nerves; Hormones; Metabolism This is supported by a series of laboratory based practical investigations covering the following areas: Analysis of carbohydrates; Exploring Lipids;
Behaviour of Amino acids and Proteins; Enzymes; Nutrition. The course is examined through a series of term tests, practical laboratory write ups, and an end of term exam based on multiple choice questions and essay style questions.

EV4005 - GRASSLAND AND GRAZING MANAGEMENT
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Biological Sciences

Rationale and Purpose of the Module: To educate students in the principles of grazing and grassland management with particular reference to the equine industry in Ireland

Syllabus: 1. Introduction, Soil formation, Physical and chemical properties of soil, Soil fertility, Lime and pH
Major and minor elements in soil , Fertilisation in horse pastures, Grass growth. Reseeding of pastures 10. See mixtures Grazing management Hay production Silage production Poisonous plants Racing track management.

EV4025 - EQUINE BREEDING AND GENETICS
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Biological Sciences

Rationale and Purpose of the Module: Basic genetics including, cells, chromosomes, genes, alleles, gametes, genotype, phenotype; mitosis; meiosis and its role in genetics, genetic recombination; distances between genes; linked genes, Gene mapping; chromosome structure; DNA; replication, transcription, translation and the genetic code; Inborn errors of metabolism; Sex limited inheritance; PCR; Mendelian genetics including recessive, dominant, X linked and polygenic inheritance. Gene interaction, codominance and incomplete dominance; epistasis; Equine coat colour loci including extension, agouti, colour diluting loci, epistatic modifiers, tobiano, overo and spotting loci, mendelian and non mendelian aspects of equine coat colour; Biological basis of sex; X chromosome inactivation; Pedigree analysis and inheritance, determination of inheritance patterns; the normal karyotype; parentage testing of horses, including blood group testing, biochemical polymorphisms, DNA testing; Abnormal chromosome number and structure; including sex chromosome abnormalities and autosomal trisomies; population genetics, The Hardy-Weinberg law, extensions to the Hardy-Weinberg law including multiple alleles and X linked genes; genotype frequencies; heritability; narrow and broad sense heritability; quantitative trait loci; genotype-environment interaction; estimated breeding values and selection; BLUP; Relationship; Inbreeding and linebreeding.

FT4305 - FOOD ENGINEERING PRINCIPLES
ECTS Credits: 6 (Year 3 Module)
Biological Sciences

Rationale and Purpose of the Module: To provide students with an understanding of the basic engineering principles underpinning the processing of foods. To provide students with a understanding of the basic principles of heat and mass transfer as applied to food engineering.

Syllabus: Heat transfer; Conduction, convection and radiation. Convection: natural and forced. Heat transfer in parallel and in series. Heat transfer co-efficients. Operation of Heat transfer systems. Solving Heat transfer problems. Saturated and Supersaturated Steam tables. Mass transfer: Unit operations, Steady and non steady state operations. Overall and Component Mass Balances. Fluid Transport: Fluid statics and dynamics. Momentum and energy conservation in fluid systems. Flow behaviour: Newtonian and non- Newtonian fluids. Flow in pipes, pressure drop, friction factor. Pumps; Centrifugal and positive pumps. Flowmeters, Venturi meter, Rotameter. Units of measurement. Solving fluid flow problems. Humidity/Psychrometrics: Air

moisture content. Dry and wet bulb temperatures. Psychrometric charts. States of water, triple point. Drying curves.

Prerequisites: PH4022

FT4375 - FOOD PROCESSING OPERATIONS

ECTS Credits: 6 (Year 3 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: to provide students with a direct link between the theoretical aspects of different food processing operations with the practical aspects of processing of specific consumer foods,

Syllabus: A detailed overview of the major unit operations used to convert raw materials into foods merged with specific practical sessions on dairy processing, such as in the manufacture of cheese and yoghurt. Basic principles of evaporation, spray drying, refrigeration, freeze drying, membrane separation technologies (ultrafiltration, microfiltration, reverse osmosis, electrodialysis), canning, freezing and irradiation. Basic principles of mechanical and phase separations. Microbiological, chemical and physical effects of processing on foods. Practical examples of the application of different unit operations in the manufacture of safe and nutritious consumer foods such as cheese, yoghurt and emulsified food products.

Prerequisites: FT4204

FT4447 - FOOD QUALITY

ECTS Credits: 3 (Year 3 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: To provide a comprehensive course on food quality and safety.

To develop an understanding of the physical, molecular, and microbiological basis of food quality.

Syllabus: Physical properties of foods. Instrumental methods for measurement of colour, texture, viscosity. Organoleptic procedures. Relationship between instrumental and sensory methods of analysis. Chemical aspects of flavour. Microbiological quality standards. ISO 9002, quality systems. Effects of food packaging technology on food quality during distribution and storage. Human nutrition issues in food quality.

Prerequisites: FT4204

BY4031 – INTEGRATIVE PHYSIOLOGY

ECTS Credits: 6 (Year 3 Module)

Biological Sciences

Rationale and Purpose of the Module: Integrative Physiology is the study of key mechanisms and regulatory functions underpinning physiological processes at all biological levels ranging from the molecular and cellular level to tissue and organs. In this module we will introduce students to the basic concepts and principles of integrative physiology with a focus on neuronal, neuroendocrine, and endocrine control of organ systems. On completion of the module, students will be able to: demonstrate a knowledge of the structure and function of major human physiological systems. Additionally, the influence and relationship between various human physiological conditions will be considered.

Syllabus: This module will examine the structure and function of the major human physiological systems. The nervous system, from the cellular level to neural circuits and the processing and translation of information to activate or maintain homeostasis of other organ systems through nerve impulses or hormonal control. The endocrine system, together with the nervous system performing neuroendocrine signaling. Key organ systems under control of neuronal, endocrine, and neuroendocrine signaling are discussed with a focus on the male and female reproductive systems, including spermatogenesis and the endocrine regulation of puberty and sexual function. Further, the physiology of the female reproductive cycle, the establishment of pregnancy

as well as the regulation of parturition and lactation. The physiology of other systems under the control of neuronal, endocrine, and neuroendocrine signaling such as the musculoskeletal system are investigated, including the control of contraction/relaxation of skeletal muscle as well as the synthesis and remodeling of bone, and the physiology of the cardiovascular system, the cardiac cycle, neuroendocrine regulation of cardiac output, and blood pressure.

BY4035 – CELLULAR BIOLOGY AND BIOCHEMISTRY

ECTS Credits: 6 (Year 3 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: To provide a solid understanding and knowledge of fundamental biochemical processes which will underpin the ability of secondary school educators to communicate effectively the central principles of biology.

Syllabus: The course is delivered as a series of lectures covering the following topics: - Topic 1 : Carbohydrates - Topic 2 : Lipids - Topic 3 : Amino acids - Topic 4 :Protein - Topic 5 : Nucleic acids - Topic 6 : Enzymes - Topic 7 : Membranes - Topic 8 : Muscles - Topic 9 : Nerves - Topic 10 : Hormones - Topic 11 : Metabolism This is supported by a series of laboratory based practical investigations covering the following areas: - Area 1: Analysis of carbohydrates - Area 2: Exploring Lipids - Area 3: Behaviour of Amino acids and Proteins - Area 4: Enzymes - Area 5: Nutrition The course is examined through a series of term tests, practical laboratory write ups, and an end of term exam based on multiple choice questions and essay style questions.

BY4075 – CELL COMMUNICATION AND REGULATION

ECTS Credits: 6 (Year 3 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: This module introduces students to concepts and experimental techniques in eukaryotic cell biology, molecular biology, and genetics. The module covers basic cell structure, the principles of the cell cycle and cell division, the control of living processes by genetic mechanisms, and techniques for genetic manipulation such as gene cloning, and investigating cell biology. These concepts are central to the understanding of cellular regulation within multicellular organisms. Note: BY4035 Cell Biology and Biochemistry or an equivalent module is a prerequisite for this module

Syllabus: Functional Geography of Cells; Introduction to Cell Organisation, Variety and Cell Membranes; Molecular Traffic in Cells; Organelles involved in Energy and Metabolism. Eukaryotic Cell Cycle; Chromosome Structure & Cell Division; Meiosis and Recombination; The Extracellular Matrix; The role of receptors and signal transduction in the function of cells; how hormones, neurotransmitters, growth factors and other molecular messengers act and the roles of cell surface receptors, nuclear receptors and associated signalling proteins such as G proteins and kinases; The structure/function relationships of receptors (nuclear and cell surface) and signalling molecules.

BY4085 – CELL AND MOLECULAR BIOLOGY OF THE IMMUNE SYSTEM

ECTS Credits: 6 (Year 3 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: This course provides a detailed understaning of immunology at the cellular and molecular level. Students will develop a comprehensive understanding of the principles of self and non self recognition and how these mechanisms are involved in immunity and how aberrant self-regulation contributes to allergy and autoimmunity. The concepts will also serve to provide a foundation for the concepts of molecular and regenerative medicine, and cancer therapeutics. Note: Section 12

Prerequisite module: Microbiology and Immunology 2147 will be prerequisite for this module.

Syllabus: Cellular Immunology: the cell types involved in immune responses, the interactions between these cells during immune and inflammatory responses, and the mechanisms of host response against infectious pathogens.The molecular basis of immune recognition,mechanisms underlying T and B cell recognition of antigens and antigen processing, in transplantation, viral immunity and in various immune diseases. Mechanisms of host response against infectious pathogenic agents, transplantation, vaccine design, immunodeficiency and other immune disorders. Immune dysfunction and chronic inflammatory diseases such as rheumatoid arthritis and asthma, cancer immunology, immunogenetics and immune

Prerequisite: BY4014

FT4214 – PUBLIC HEALTH NUTRITION

ECTS Credits: 6 (Year 3 Module)

Biological Sciences

Rationale and Purpose of the Module: This module provides the necessary understanding, knowledge and skills to allow students undertake more advanced learning in nutrition in subsequent semesters. Public Health Nutrition will focus on population-based epidemiological evidence linking diet and disease and explore interactions between nutrition, genetics and lifestyle. Specific topics of issue to public health including obesity, type II diabetes, heart disease, specific micronutrient deficiencies, dental health, osteoporosis, cancer and immunity will be discussed. The role of national and international regulatory agencies (including the World Health Organisation, Food Safety Authority of Ireland, Food Safety Promotion Board, European Food Safety Agency) will be examined in terms of safe guarding population public health. The purpose of this module is to: a). To provide an overview of the role of nutrition as a major factor in the aetiology of chronic disease of relevance to public health b). To examine the role of diet in treatment and prevention of a range of chronic disease c).Explore a number of emerging diet-related public health issues. The most relevant and up-to-date literature will be used and referenced to provide the best evidence base for this module content.

Syllabus: Overview of public health nutrition from an epidemiological perspective and strategies to tackle major, population-based public health issues including ecological public health strategies . 2. Examine the role of diet in selected chronic disease of public health concern including obesity, type II diabetes, heart disease, specific nutritional deficiencies, dental health, osteoporosis, cancer and immunity. 3. Discuss the role of media / regulatory bodies / food industry / society / culture on major public health issues. 4. Other factors (environmental, psychological) influencing consumer food and lifestyle choice and attitudes surrounding preference will also be explored. 5. Examine the role of national and international regulatory agencies in ensuring consumer public health including; World Health Organisation, Food Safety Authority of Ireland, Food Safety Promotion Board, European Food Safety Agency.

Prerequisite: BY4214

BY4037– PHARMACOLOGY AND DRUG DEVELOPMENT

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: Rationale and Purpose of the Module: The module will present State-of-the-art concepts to students in the area of pharmacology and drug development. The module will set out the biology behind drug target choice including the function of the protein targets. The purpose of the module is to integrate the students learning with recent advances in drug screening techniques and new strategies employing non-Lipinski molecules as drugs. The course will use extensive reading of primary literature and reviews to embed the knowledge of techniques, capabilities and challenges in the area.

Syllabus1. Classes of drugs 2. Mechanisms of drug action 3. Pharmacokinetics 4. Drug discovery 5. High-throughput methods in drug discovery 6. In silico techniques in drug discovery 7. Drugs targeting infectious agents 8. Drugs targeting membrane proteins - CNS, hormone receptors 9. Drugs targeting inflammatory diseases - e.g. allergy, auto-immune disease, arthritis 10. Drugs for treating diabetes 11. Biologicals for the treatment of diseases - DNA, RNA, proteins and peptides 12. Drug delivery systems 13. Bringing lead candidate drugs forward for development, the challenges.

ER4708– BIOMETRICS

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: To provide a practical course in analysis of the type of data encountered in environmental science and health and safety.

Syllabus: Practicals for this module consist of a weekly two hour session on computers where the students use the following packages: Microsoft Excel, SPSS for Windows and MVSP (Multivariate Statistical Package, W. Kovach). The students learn to input ecological data and transfer it between the various packages; carry out preliminary data analysis and descriptive statistics; move on to more advanced analyses. Finally, using MVSP, the students undertake simple multivariate procedures including dendrograms and correspondence analysis.

Biological Sciences Year 4 Modules

EQ4027 - EQUESTRIAN FACILITIES

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Restrictions: Equine experience resume required

Biological Sciences

Rationale and Purpose of the Module: Analysis of requirements for equine facilities with regard to; racing, sports horses, breeding, competition, exercise and training, client facilities, horse welfare and soundness, disease control, isolation and quarantine facilities. Ancillary facilities; feed stores, gallops, arenas, fixed and portable fences, dry and water treadmills, solaria, wash boxes, weighing facilities, loading bays, equipment storage, farriery and breeding areas, road and air transport environments. Planning and building requirements; materials, environmental impact, waste disposal, aesthetics. Use of ICT in equestrian establishments; staff training, monitoring horses, entries and administration, horse and client records, veterinary applications.

EQ4037 - PERFORMANCE RIDER DEVELOPMENT

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Restrictions: Equine experience resume required

Biological Sciences

Rationale and Purpose of the Module: Analysis of performance demands on the rider; sports disciplines, racing (flat and National Hunt), endurance, mental and physical capacities. Characteristics of performance riders; body morphology, attitudes to training, relationships with coach and supporters, technical, tactical, physical, mental and lifestyle capacities. Analysis of rider motor and proprioceptive capacity; video analysis, appropriateness and efficiency of sport movement, common difficulties in movement patterns, developmental plans for riders in various disciplines. Developing the rider; use of technology and equipment to provide feedback and support practise, use of novel development tools, athlete diaries, athlete driven reflection and goal setting, maintaining technique and focus in stress environments - race finishes, jump offs. Models of motor skill development and use of appropriate technology and equipment to support motor skill development.

FT4007 - FUNCTIONAL FOODS

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: This module aims to give students a comprehensive understanding of functional foods development – from the idea mining to the product on the market. This module will introduce the steps to develop potentially functional foods. It will encompass regulatory aspects (i.e., European Food Safety Authority, EFSA), technological hurdles and operations, and advanced mechanistic concepts in biochemistry related to human health status. Critical evaluation of the evidence on selected functional foods, bioactive compounds (nutrients or non-essential compounds), and beneficial micro-organisms (probiotics) in the light of in vitro, cell-based/animal-based protocols and clinical trials. Case studies published in relevant outlets will give students a practical understanding of the importance of functional foods from technological, nutritional, and epidemiological standpoints. A detailed literature review on a relevant research area will be conducted as part of the overall assessment and to further the student's ability to critique scientific research. Students will be expected to prepare a detailed oral presentation on their findings and guide a discussion to enhance communication skills.

Syllabus: 1. Functional foods (FF): definition scientific, nutritional, and technological importance; 2. EU regulation of FF and Nutraceuticals; 3. Description of the most consumed and studied FF: mechanisms of action, in vitro and in vivo studies (preclinical trials and clinical trials) focused on health outcomes and toxicological aspects; 4. Innovation and development in the AF industry; 5. Technical and scientific challenges in the FF industry; 6. Overview and discussion of examples of innovation in the scientific community.

FT4437 - MILK PROTEINS AS FOOD INGREDIENTS

ECTS Credits: 6 (Year 4 Module)

Biological Sciences

Rationale and Purpose of the Module: To provide students with an advanced understanding of the role of milk proteins as food ingredients.

Syllabus: Milk protein chemistry: caseins, whey proteins, minor constituents. Functional properties of milk proteins: emulsification, foaming, gelation. Significance of milk protein variants to the processing properties of milk, rennet coagulation, cheesemaking, heat stability. Enzymatic hydrolysis of milk proteins: commercial proteinases, hydrolysate characterisation. Milk protein allergenicity: immunoreactive peptide sequences, reduced/hypoallergenic milk protein hydrolysates. Nutraceutical/ bioactive peptides: caseinophosphopeptides, angiotensin converting enzyme inhibitors. Special assignments will involve review and discussion of relevant research papers.

FT4457 - RESEARCH TRENDS IN HEALTH AND FOOD

ECTS Credits: 3 (Year 4 Module)

(Lab-Based Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: To develop a high standard of competence in the acquisition and evaluation of scientific research information.

To enable students develop a critical awareness of emerging research in the field of food science and health.

Syllabus: Using specific examples, students will be trained how to critically evaluate research information. Students will be made aware of the requirements in technical writing and presentation skills. Demonstration of advanced information retrieval using the web of science and other abstracting services. Individual students will be assigned topics on emerging issues in food science

and health research. Students will be required to write scientific reports and give presentations on their findings.

Representative areas and specific topics include:

Food quality and safety (acrylamide, dioxins, genetically modified foods, organic foods) Novel food processing (ultrasonic and high pressure processing) Diet and health (cardiovascular disease, diabetes, the immune system, cancer, dieting and health) Food toxicology and allergenicity (novel food ingredients, food protein allergenicity) Neutraceuticals (Hypotensive peptides, peptides and cognitive function)

Neutrigenomics (Diet and gene interactions)

Prerequisites: FT4335

FT4355 - ADVANCED NUTRIENT METABOLISM AND HEALTH

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: The purpose of this module is to give students a comprehensive understanding of energy metabolism and the metabolic processes involved in nutrient catabolism at a whole body level. This module will critically evaluate selected nutrients and bioactives with a focus on their potentialhealth benefits. It will provide a comprehensive understanding of the aetiology and management of nutrition-related disorders in the clinicalsetting. The purpose of this module is to: Provide advanced concepts in nutrient metabolism including an overview of the metabolic pathways involved in energy metabolism, catabolism and anabolism. The control of metabolic reactions.Outline the metabolism of selected nutrients. Critical evaluation of the evidence on selected nutrients and bioactives and their potential health benefits.Explore the use of nutrition for health in the clinical setting. Practical case studies will give students a practical understanding of the importance of nutritional management in a range of clinical conditions. As part of the overall assessment, and to further student ability to critique scientific research, a detailed literature review on a relevant research area will be conducted. Students will be expected to prepare a detailed report on their research work and to make a presentation on their findings to enhance communication skills.

Syllabus: Overview of energy metabolism for the whole body including carbohydrate, protein and lipid metabolism. Interplay between various metabolic regulatory systems (metabolic and hormonal) and adaption to various metabolic demands (starvation, overfeeding etc.) The importance of physical activity in energy expenditure and the thermic effects of food. Metabolism of selected nutrients and dietary bioactive components in relation to health (including fat- and water-soluble vitamins, essential fatty acids, phytochemicals, prebiotics). Overview of nutritional strategies to manage disease conditions.

Prerequisites: FT4204/FT4305

BY4027 - CURRENT TRENDS IN BIOTECHNOLOGY AND REGENERATIVE MEDICINE

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

Biological Sciences

Rationale and Purpose of the Module: The module will present State-of-the-art concepts to students in biotechnology and molecular medicine. The purpose of the module is to integrate the students learning with the cutting edge of these advanced fields. The course will use extensive reading of primary literature and reviews to embed the knowledge of techniques, capabilities and challenges in the area.

Syllabus: The syllabus will include 1. Next generation sequencing, genetic screening and their use in modern medicine 2. CRISPR technology and its potential in modern medicine 3. Cell on a chip technology and its potential in modern medicine 4. Genetic basis of disease and gene therapy 5. Stem

cells and their medical uses 6. Tissue regeneration and repair (e.g. Central Nervous System, limbs) 7. Wound healing 8. Bioengineering 9. Extracellular matrix and scaffolds 10. 3D bioprinting for tissue regeneration 11. Ethical considerations in modern medicine

Chemical Science Year 1 Modules

CH4021 - LABORATORY CALCULATIONS

ECTS Credits: 3 (Year 1 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: Many students entering the University of Limerick to study science courses do not have chemistry as a leaving certificate subject. Given that by its nature chemistry is a very conceptual subject, the rationale for this module is to introduce all students to some of the more basic concepts in fundamental chemistry and appropriate calculations associated with common laboratory practice.

Syllabus: Valency- the periodic table, valency as applied to the periodic table grouping, combining atoms to form molecules. Common Ions & Molecules- sulphates, chlorides, nitrates, phosphates, hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid, acetic acid, sodium hydroxide, sodium carbonate, sodium chloride.

Moles-The Moles triangle, grams, moles, gas volume, molecules, interchangeability of grams, volume and number of molecules through moles. Concentrations- moles, molarity, percentage solutions, volume over volume, weight over volume, parts per million, parts per billion, conversion of one form of unit to another. Serial Dilutions- moving between concentrations, dilutions.

Acids/Bases- balancing equations-titrations and titration calculations. Redox Reactions- balancing equations-titrations and titration calculations. pH - strong acids, strong bases, weak acids and weak bases, dissociation of acids and bases, solution pH, pOH.

Prerequisites: CH4701, CH4711, CH4721

CH4051 - INTRODUCTION TO APPLIED CHEMISTRY AND BIOCHEMISTRY

ECTS Credits: 3 (Year 1 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To introduce the student to the disciplines of Applied Chemistry and Industrial biochemistry. To provide the student with a reference framework for future core course modules. To generate student interest and enthusiasm for the subject areas by focusing upon relevant, topical issues of broad public interest

Syllabus: Importance of chemical and biopharmaceutical industry globally and use of fundamentals relating to chemistry and biochemistry underpinning consumer chemicals (such as detergents, shampoos, cosmetics etc), pharmaceuticals (eg aspirin, paracetamol, penicillin), oil industry (diesel, petrol, tars) and semiconductor industry (materials and processes involved in silicon processing and etching for microchip devices) as well as biopharmaceuticals, such as antibodies, insulin and other proteins.

Chemistry: Case studies where chemistry has solved major problems e.g developments in glass manufacture that makes iphones possible, the advances in synthetic chemistry that allowed antibiotics to be produced at a global scale; the fundamentals of chemistry in polymers and polymeric processes; the chemistry of how aluminium is produced from bauxite and chemistry that makes lithium ion batteries possible. Analytical chemistry and its role in forensics; The role of an industrial chemist in a work environment.

Industrial Biochemistry includes production of genetic engineered protein; overview of approaches and applications. The human genome project and its impact on society. The biochemistry of HIV, including viral structure and biology. Biotechnological approached to developing a antibodies, vaccine. Molecular biology of cancer. Oncogenes and cellular transformation. Approaches to drug discovery and drug delivery. Products of pharmaceutical biotechnology and their medical uses. The unique biology of extreme/hyperthermophiles. Hyperthermophiles as a source in industrially relevant substances. Practical applications of industrial biochemistry.

Review of biochemical processes currently used at an industrial scale. Some fundamental concepts in bioprocess engineering. The role of an industrial biochemist in a process work environment. Fundamentals of cellular respiration. The approach to research; case studies; identification of a problem, planning and pursuing a research strategy.

CH4701 - GENERAL CHEMISTRY 1

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: Many students that enter the University of Limerick to study science and engineering courses do not have chemistry as a leaving certificate subject. The rational of this module is to introduce all students to some basic concepts in Chemistry. More specifically: To give students an understanding of the fundamental concepts of modern chemistry. To familiarise students withthe various applications of chemistry in everyday life. To develop the basic laboratory skills associated with practical chemistry.

Syllabus: Simple characterisation of atoms and molecules: basic atomic structure, ions and isotopes, atomic and molecular weights, the mole concept.

Early chemical concepts and their present day uses: e.g. Dalton Atomic Theory, Avogadro's Law, Oxidation and reduction. Chemical nomenclature. Modern theories of atomic and molecular structure. Quantum mechanical description of the atom: Schroedinger Wave Equation, atomic orbitals and quantum numbers. Introduction to chemical bonding. Bond representation by Lewis dot, valence bond and molecular orbital structures. Hybridisation. Periodic classification of the elements. The Gas Laws, Stoichiometry. Classification of chemical reactions. The Electrochemical Series. Chemical equilibrium. Liquid solution chemistry. Acids and bases. Selected applications of chemistry in domestic, medical and industrial environments.

ER4001 - ENERGY AND THE ENVIRONMENT

ECTS Credits: 6 (Year 1 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To draw upon core scientific module of the program e.g, thermodynamics while exposing students to the local, regional & global environmental effects that arise from the generation and use of energy.

Syllabus: Energy Resources & Supply
Thermodynamics of energy conversion
Electricity generation & storage Fossil fueled power generation Transportation Clean Technology for energy generation and transmission Nuclear power generation

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ER4101 - SYSTEMATIC ENVIRONMENTAL SCIENCE

ECTS Credits: 6 (Year 1 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module:
Environmental Science is a broad interdisciplinary subject: first year students require guidance on its scope and nature. This module provides an overview of scientific thinking, scientific method and environmental science. It explains the purpose and significance of modules through the 4 year programme.

Syllabus: Science and scientific method; sustainable development; models in science; systems and system functioning; ecosystem functioning: energy flow, biogeochemical cycles and ecological succession; effects of agriculture on the environment; toxicology and risk assessment; fossil fuels and the environment; water and air pollution; waste management; environmental impact assessment.

Chemical Science Year 2 Modules

BC4903 - BIOMOLECULES
ECTS Credits: 6 (Year 2 Module
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: To impart an understanding of the structure, properties and biochemical function of the major groups of biological molecules found in living organisms, along with selected biotechnological applications of such biological molecules. To impart some basic biochemical laboratory skills, principally how to detect & quantify selected biomolecule types.

Syllabus: The range of biomolecules. Evolution of biomolecules. Structure, properties & functions of: amino acids, peptides & proteins; carbohydrates including monosaccharides, diasaccharides and polysaccharides; fatty acids, energy storage lipids, structural lipids and ecosanoids; nucleic acids including DNA, RNA and their building blocks; vitamins. Selected biotechnological applications; enzymes, antibodies, hormones and gene therapy. The production of high fructose corn syrup. Bioethanol production. The dynamics of life. Overview of metabolism; anabolism and catabolism. Glycolysis.

CH4004 – PHYSICAL CHEMISTRY 3
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 10
Chemical Sciences

Rationale and Purpose of the Module: i. To facilitate students in understanding the fundamental thermodynamic laws and functions that rule a process of change in a physical chemical system. ii. To provide students with requisite knowledge of analysing physical chemical systems, such as the phase transformation of a pure substance, the mixing and phase transformation of two components, using thermodynamic and derived thermodynamic functions. iii. To familiarise the students with the phase diagrams and the use of these to analyse the above-mention physical chemical system. iv. To provide the students with basic knowledge of electrochemistry, electrochemical cell and their thermodynamic account.

Syllabus: - 1st Law of Thermodynamics; Enthalpy - Entropy; 2nd and 3rd Laws of Thermodynamics; Clausius Inequality - Helmholtz and Gibbs Energies - Chemical Potential; Fundamental Equation of Chemical Thermodynamics - Physical Transformations of Pure Substances: Phase Diagrams; Phase Stability and Phase Transitions; The Physics of Liquid Surface - Simple Mixtures: Gibbs-Duhem equation; RaoultÆs and HenryÆs Laws - Phase Diagrams: Phase Rule; Two-Component Systems - Equilibrium Electrochemistry: Thermodynamic Properties of Ions in Solution; Electrochemical Cells; Nernst Equation

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CG4003 - BIOPROCESS ENGINEERING 1
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: Overview of biochemical processes currently used on an industrial scale. Introduction to biochemical process design strategies for high value/low volume and low value/high volume products. Material and energy balances for bioprocessing operations. Aspects of mass transfer of importance in aerobic fermentations. Biochemical reaction kinetics for cell free enzyme, single cell, cellular agglomerate, and immobilized enzyme systems.
Bioreactor design for ideal batch and ideal chemostat operations. Practical aspects of bioreactor operation and monitoring: sterilization, asepsis, inoculation, rheology, aeration, agitation, instrumentation, and sampling. Introduction to

commercial scale bioproduct separation and purification methods. Industrial biosafety.

CH4003 - PHYSICAL CHEMISTRY 2

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To facilitate the student in understanding of the reaction thermodynamics and the role of thermodynamics in chemical reaction processes. To familiarize the student with the various reaction kinetics, including some complex kinetic schemes, their interpretation, and applications in the appraisal of industrial problems. To develop the student's ability to design basic kinetic experiments and to extract kinetic information from the measurements of concentration-time based data. To provide the student with the basic knowledge of commonly used spectroscopes.

Syllabus: Reaction Process, role of thermodynamics

FickÆs law, diffusion Rate laws, integrated and differential forms Zero, first and second order rate laws

Arrhenius equation, collision theory, activated complex theory Mechanism of reaction, steady state approximation Lindemann hypothesis, role of equilibria

Photochemistry, fast reactions, polymerisation reactions Michaelis-Menten kinetics Catalysis Langmuir adsorption isotherm Applications to selected examples of industrially important reactions.

Prerequisites: CH4002

CH4013 - ORGANIC CHEMISTRY

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To introduce the student to fundamental aspects of organic chemistry eg the different families of compounds- their nomenclature, structure (2D and 3D) and isomerisation (if any).

To highlight the functional group of each family and relate structure to reactivity; to examine associated reactions/reaction mechanisms of the different functional groups; to introduce aromatic chemistry and study the chemical behaviour of aromatic compounds; to highlight current trends and applications in the areas of organic chemistry. To carry out practical work to support and reinforce some of the theoretical aspects encountered; to encourage self-directed learning through the use of software and web sources.

Syllabus: Aliphatic Hydrocarbons: Alkanes/Cycloalkanes/Alkyl Groups/Alkenes/Cycloalkenes/Alkynes: Nomenclature; Structural formulae (2D&3D); Isomerisation; Reactions: Combustion and Free Radical Rxns (Alkane/Cycloalkanes); Electrophilic Addition Rxns., Carbocations; Polymerisation; (Alkenes/Cycloalkenes/Alkynes). Occurrence/Uses. Environmental factors/current trends. Haloalkanes: Structural formulae; Nomenclature; Substitution/Elimination Reaction Mechanisms- SN1, SN2; E1, E2. Alcohols/Ethers: Structural formulae; Nomenclature; Classification; Physical properties; Occurrence and Uses. Alcohols only:- Acidity; Preparation; Reactions: Oxidation, Esterification. aldehydes/ Ketones: Structure & Basicity of the Carbonyl Group; Nomenclature; Properties; Preparation; Typical Carbonyl Group Reactions (Nucleophilic Addition Reactions); Imine formation; Reaction with Grignard Reagents; Synthesis; Occurrence/Applications. Carboxylic Acids and Carboxylic Acid Derivatives: - Esters, Acyl Halides, Acid Anhydrides and Amides. Functional Group; Nomenclature; Physical Properties; Acidity of the Carboxyl group; Preparation; Nucleophilic Acyl Substitution Reactions (Simple Carboxylic Acids and Esters only). Amines: Classification; Aliphatic and Aromatic Amines; Reactions; Occurrence. Aromatic Hydrocarbons: Benzene and Benzenoid ompounds. Aromaticity- Huckel Rule; Structural

Formulae; Nomenclature, Electrophilic Aromatic Substitution Rxns Mechanism; Few examples.Occurrence/Uses.

CH4103 - ORGANIC CHEMISTRY 2A(1)

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To build on the functional group chemistry covered in CH4102. To extend the students comprehension and working knowledge of functional group chemistry; to expand the range of reagents, reactions and associated mechanisms. To establish a foundation in stereochemistry and to develop the students understanding of its relevance to organic reactions.

Syllabus: Aldehydes and ketones (Part 2): Carbon-based nucleophiles continued û Wittig reaction and enolate anions; Aldol and Claisen condensation reactions; alkylation at the a- position.
Carboxylic acids: methods of preparation; using pKa as a measure of acid strength; formation of derivatives such as acid chlorides andesters. Carboxylic acid derivatives û acid halides, anhydrides, esters and amides; nucleophilic displacement reactions; Aromatic structure and reactivity (Part 1): defining aromaticity andunderstanding aromatic stabilization; HuckelÆs rule; electrophilic aromatic substitution reactions;Stereochemistry: defining and naming chiral centres, enantiomers, diastereomers and meso forms; Fisher projections; understanding the stereochemical course of SN1 and SN2 reactions; applying use of stereochemistry and kinetic measurements to deduce the nature of a chemical reaction pathway.

Prerequisites: CH4103

CH4203 - INORGANIC CHEMISTRY 2

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: - To describe and explain the main features of the chemistry of the main group elements (s and p block) in relation to position in the Periodic Table - to understand the principles underlying the chemistry of metallic elements in the s-, p-, d- and f- block elements and to describe and explain the main features of this chemistry in relation to position in the Periodic Table. - To introduce students to the chemistry of transition metal complexes

Syllabus: The Periodic Table and important trends: s-block, p-block, d-block and f-block metallic elements. Electrode potential diagrams. Comparison of main group and transition metals. Hard and soft acid and base theory. Complexes: structure, isomerism, magnetic and spectroscopic properties. Reaction mechanisms. Properties of first row transition metals. Comparison of first row and second and third row transition metals. Chemistry of the lanthanides. Bonding in transition metal complexes, crystal field theory, Organometallic compounds Cluster compounds, multiple metal to metal bonds. Chemistry of metallic s and p block elements group by group.

Prerequisites: CH4122

CH4253 - INORGANIC CHEMISTRY 2B

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: - To describe and explain the main features of the chemistry of the main group elements (s and p block) in relation to position in the Periodic Table and to understand the principles underlying the chemistry of metallic elements in the s-, p-, d- and f- block elements and to describe and explain the main features of this chemistry in relation to position in the Periodic Table. - To introduce students to the chemistry of transition metal complexes.

Syllabus: The structure of the Periodic Table and important trends: s-block, p-block, d-block

elements. Polarising power. Chemistry of hydrogen and s and p block elements group by group. Electrode potential diagrams. Comparison of main group and transition metals. Properties of first row transition metals. Organometallic compounds. Survey of biological importance of the elements.
Prerequisites: CH4701, CH4252

CH4303 - ANALYTICAL CHEMISTRY 1A
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: To give the students an understanding of and an appreciation for the qualitative and quantitive aspects of analytical chemistry through a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

Syllabus: The analytical process, measurements and experimetal error, fundamentals of spectrometry, Beer- Lambert law, applications of spectrometry, spectrometers, atomic spectroscopy, calibration and analytical methods, infrared spectroscopy, modes of stretching and bending, fourier transform ir, correlation charts for ir, functional group survey, nmr basic concepts, chemical shift & shielding, Pulsed FT nmr, integration, spin-spin splitting in 1H spectracoupling constants, combined ir/1Hnmr spectra interpretation.
Prerequisites: CH4303

HS4003 - OCCUPATIONAL HYGIENE 1 ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: To familiarise the student with a broad range of occupational hygiene issues currently pertinent to the workplace environment.
To further develop the students' awareness of the occupational hygiene approach to hazard recognition, evaluation, monitoring and control in respect of selected chemical and physical hazards.
To enhance the students skills in the use of appropriate measuring equipment and evaluation of findings in the context of occupational exposures.

Syllabus: [Hazards]: recognition, measurement & evaluation control; [Survey design]: personal monitoring, area monitoring, surface monitoring [Chemical hazards]: Atmospheric Dust & fumes, active/inert, total/respirable fraction, occupational exposure levels, time-weighted average of exposure, analytical techniques. Gases/Vapours, active versus passive sampling, sampling techniques, direct reading instruments, units of concentration, control of airborne contaminants, ventilation, dilution ventilation, number of air changes, local exhaust ventilation, collection devices, ducting, fans, capture velocity, transport velocity. Safety technologies and personal protective equipment.
[Physical hazards]: Noise, sound, sound frequency, wavelength, sound power, sound pressure, intensity, sound levels in practice, sound weighting, statistical noise levels, LAeq, LAepd, sound measurement techniques, sound radiation, Noise control, absorption, reduction, enclosures, noise barriers, hearing protection, audiometry. Safety technologies and personal protective equipment.
[Relevant Legislation and Codes of Practice]

Chemical Science Year 3 Modules

BC4825 - MICROBIAL TECHNOLOGY 2
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: To build on the fundamental concepts of microbiology. To develop skills in manipulating and identification of

micro-organisms. To develop an understanding of metabolic pathways. Understanding basic concepts in microbiology for the development of diagnostic kits. To illustrate the role of microbiology in the clinical and food environment. Understand viruses and their life cycles.

Syllabus: Principles of metabolism: the major pathways, Glycolysis, Embden Mayerhoff and Pentose Phosphate Pathways, Electron transport and Chemosmosis. Traditional and novel fermentation processes. Systematic (taxonomy) microbiology. Clinical microbiology: use of chemotherapeutic agents and susceptibility testing. Developments in microbial diagnostic kits for clinical and industrial/food applications. Viruses: general characteristics.

Prerequisites: BC4803, BY4001

BC4905 - GENETIC ENGINEERING

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To introduce the techniques involved in genetic engineering and to familiarise the students with their theoretical basis and practical uses To demonstrate the diverse applications of the techniques of molecular biology in research and development and quality control in a wide variety of industries To impart core laboratory skills relevant to molecular biology To prepare the students for careers in the biotechnological/biopharmaceutical/etc industries

Syllabus: DNA structure, transcription, translation; Gene structure function and control. Molecular techniques to manipulate DNA, restriction enzymes and other DNA modifying enzymes; DNA transfer methods; polymerase chain reaction; cDNA and genomic cloning; cloning and expression vectors; selection and screening methods; phenotypic Vs genotypic screening; Northern, Southern and Western blotting; heterologous protein expression; cloning in plants and animals; introduction to bioinformatics - databases and genome analysis; gene therapy; transgenic animals; ethics of genetic engineering. Nucleic acid diagnostics: DNA profiling and DNA fingerprinting.

Prerequisites: BC4903, BC4904

CG4005 - CHEMICAL ENGINEERING THERMODYNAMICS

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Note: There is a prerequisite for prior modules in physical chemistry so students would need to have taken thermodynamics and kinetics

Chemical Sciences

Rationale and Purpose of the Module: To give students knowledge and understanding of (i) methods for estimation of pure component properties, (ii) methods for correlation and prediction of phase equilibria, and (iii) the thermodynamics of energy conversion cycles.

Syllabus: Application of the first and the second law of thermodynamics in chemical engineering: identify and describe open and closed systems; conditions and limitations for conversion between different kinds of energy; describe the theoretical energy conversion processes of Carnot-, Rankine- and Brayton, and understand the differences with their corresponding technical applications: steam turbines, gas turbines, cooling machines and heat pumps.

Fundamental thermodynamics of phase equilibria and methods of correlation and prediction: understand standard states and the use of activity and fugacity coefficients, understand the use and limitations of models for correlation and prediction of excess free energy and activity coefficients

Application of chemical thermodynamics to reaction engineering: spontaneity of chemical reactions, chemical reaction equilibrium, equilibrium conversion calculations

Methods of correlation and prediction of physical properties for chemical engineering calculations.

Availability and application of electronic data bases for physical properties, and software for prediction of physical properties

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CH4005 - PHYSICAL CHEMISTRY 4

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited Spaces Available: 10

There is a prerequisite for prior modules in physical chemistry so students would need to have taken thermodynamics and kinetics

Chemical Sciences

Rationale and Purpose of the Module: To familarise the student with the concepts of electrochemical systems under current flow situations.

To familiarise the student with electrochemical methods of chemical analysis. To introduce applications of electrochemical methods in energy conversion and storage, sensors and production of chemicals

Syllabus: Mass Transport in Solution. Ficks Laws of Diffusion. Electron transferreactions. Overpotential/Polarization Effects. Electrode reactions, oxidation/reduction. Electrode kinetics, Butler-Volmer equation, limiting forms. I/E curves, interplay of mass transport and electron transport. Electrical double layer. Ideally polarizable electrode, capacitance, interfacial effects, models of the double layer. Theoretical basis of electron transfer. Polarography, steady-state, sweep, convective/diffusion techniques. Electroanalytical techniques, cyclic voltammetry, chronoamperometry, chronocoulometry, potentiometric stripping analysis, differential pulse techniques. Ion selective electrodes. Biosensors. Electrodeposition: Electrocrystallisation, bath design, additives (brighteners, throwing and levelling power). Surface Treatment: Anodizing, electroforming, electrochemical (E.C.) machining, E.C.

etching, electropolishing. Electrocatalysis, electrosynthesis. Fuel cells, solar cells. Surface analysis techniques, atomic force microscopy, scanning tunneling microscopy, scanning electrochemical microscopy.

CH4015 - ORGANIC CHEMISTRY 4

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To describe the main methods of polymer production relating synthesis detail to chain architecture. To explain the molecular basis of structure-property relationships in polymers. To develop an understanding of the structure and function of proteinaceous biopolymers.

Syllabus: Polymer chemistry, addition and condensation, chain growth and step growth mechanisms, polymerisation kinetics. Branching, cross linking, and networks. Copolymerisation, types of structure and synthetic methods. Polymerisation techniques.

Chain structure and property relationships, thermal transitions. Crystallinity and morphology. Polymer solutions and methods of characterisation. Biopolymers: properties, composition and function of proteins and nucleic acids.

CH4025 - PHOTOCHEMISTRY

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To provide students with an understanding of some key elements of the theory of photochemistry and their application to analytical techniques and solar energy conversion.

Syllabus: • The terminology of photochemistry.

• The process of light absorption.

• Polyatomic light absorption. • Absorption to emission 1: fluorescence, internal conversion and the singlet state. • Absorption

to emission 2: phosphorescence, inter-system crossing and the triplet state. • Photochemistry-based analytical techniques (UV/vis and fluorescence • Photocatalysis
Prerequisites: CH4003, CH4041

CH4305 - ANALYTICAL CHEMISTRY 3
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: TO DEVELOP ANALYTICAL METHODS FOR THE QUALITATIVE AND QUANTITATIVE DETERMINATION OF SOLIDS AND SOLID SURFACES. TO INTRODUCE THE CLASSIFICATION AND CHEMISTRY OF SOLIDS

Syllabus: APPLICATION OF X-RAY METHODS INCLUDING DIFFRACTION, FLUORESCENCE AND ELECTRON MICROPROBE ANALYSIS. STRUCTURE DETERMINATION BY X-RAY METHODS. SOLID STATE REACTIONS INCLUDING CORROSION AND CEMENT CHEMISTRY; RELATIONSHIP BETWEEN CHEMICAL AND MECHANICAL PROPERTIES. APPLICATION OF GROUP THEORY, INCLUDING POINT AND SHAPE GROUPS. REVIEW OF ALL MAJOR CLASSES OF SOLIDS CRYSTALLIZATION-NUCLEATION AND GROWTH OF CRYSTALLINE SOLIDS POLYMORPHISM IN PHARMACEUTICAL SOLIDS ELUCIDATION OF THE STRUCTURE OF DNA LACTOSE CRYSTALLIZATION POLYMERS SOLID STATE TRANSFORMATIONS NON-STOICHIOMETRY AND SOLID SOLUTIONS IONIC CONDUCTIVITY IN SOLIDS-SOLID STATE SENSORS TOPOTACTIC REACTIONS AND EPITAXY

CH4405 - PROCESS TECHNOLOGY 2
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: The Process Technology 2 semester course is a continuation of Process Technology
To provide the student with a broad understanding of the principles of fluid flow and momentum transfer.
To acquaint the student with the significance of particle-fluid interaction in processing operations. To enable the student to develop expertise in the analysis and design of heat transfer processes

Syllabus: Fluid mechanics, revision of fluid statics, fluid flow, laminar and turbulant. Momentum transfer, energy relationships and the Bernoilli Equation. Newtonian and non-Newtonian fluids. Flow in pipes and vessels, pressure drop and velocity distribution. Pumps and fans, efficiencies. Flow measurement. Dimensional analysis as applied to fluid flow. Size reduction of solids,
particle size distribution. Particle - fluid interaction, free and hindered settling, elutriation, centrifugation, fluidisation and fluidised beds. Flow of fluids through packed beds. Filtration. Heat transfer: conduction, convection and radiation. Heat transfer coefficients. Heat exchangers. Dimensionless numbers in solving heat transfer problems
Prerequisites: CH4404

CH4415 - PROCESS TECHNOLOGY 3
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited Spaces Available: 5
Chemical Sciences

Rationale and Purpose of the Module: To provide the student with a comprehensive knowledge of chemical reaction engineering and reactor design.

Syllabus: Chemical reaction thermodynamics; review of chemical kinetics; ideal reactor types and design equations; design for single and multiple reactions; multiple reactor systems; temperature effects in reactor design and operation; assessment of and models for non-ideal reactor behaviour; reactor design for heterogeneous reactions.

ER4405 - CONSERVATION ECOLOGY

ECTS Credits: 6 (Year 3 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To explore the purpose of biodiversity conservation, and how expenditure of resources on conservation may be justified. To examine the concept of æbiodiversityÆ and explore its significance. To understand the impacts of humanity on biodiversity and possible mitigation measures. To provide a theoretical and practical understanding of ecological evaluation. To review case studies in the management of conservation areas, and habitat restoration.

Syllabus: Biodiversity is defined, its importance to humanity explained in terms of ecosystem services and functioning. Human impacts on biodiversity under a range of categories and mitigation measures are explored. Students are required to read and explore case studies relevant to the conservation of biodiversity.

Chemical Science Year 4 Modules

BC4011 - BIOPROCESS ENGINEERING FOR BIOCHEMISTS

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: The purpose of this module is to introduce students to more advanced aspects of bioprocess engineering, building directly on the fundamentals covered in CG4003. The students will be informed on mass transfer, biochemical kinetics, heat transfer specific to bioprocessing, mass balance, stoichiometric analysis relevant to bioprocessing, downstream processing unit operations, and emerging technologies in bioprocessing. In addition, the students will complete practical experiments relevant to course content.

Syllabus: Bulk mass transfer effects in fermentation systems. Factors affecting oxygen mass transfer in aerobic fermentations. Measurement of kLa using static and dynamic methods. Control of kLa using correlations with agitator power and other operational variables. Heat transfer in biochemical systems. Heat exchanger design in bioprocessing units. Bioreactor sizing and design for the following reactor types: fed batch, stirred fermenter, bubble column, airlift, packed bed, fluidised bed, trickle bed, and perfusion. Bioreactor scale-up. Operation and feeding regimes: chemostat with recycle, fed batch operation, and multistage reactors. Control methods: feedback, indirect metabolite control, programmed control, and emerging AI-based methods.

Bioreaction product separation processes including: cell disruption, solvent extraction, adsorption, filtration, and centrifugation.

Final product purification methods: gel filtration, process chromatography, protein crystallisation, spray drying, and lyophilisation. Regulatory and licensing systems in the pharmaceutical, biopharmaceutical, and biotechnology industries.

Prerequisites: CG4003

CH4055 - ENVIRONMENTAL CATALYSIS

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To introduce catalysts and catalytic processes to students, with particular emphasis on end-of-pipe technologies for the control of gaseous pollutant from flue gasses.

To present on overview of procedures for the preparation and characterisation of catalysts, in particular catalysts relevant for the conversion of polluting substances into more environmentally acceptable components.

Syllabus: Introduction to catalysis, Defining the environmental problem, Catalyst structure and preparation, Study of various end-of-pipe

technologies including deNOx from stationary sources, deNOx from mobile sources (petrol and diesel), destruction of VOCs, SO2 control. Catalyst characterisation: Surface area analysis, Elemental analysis, XRD and XPS.

BC4957 - BIOINFORMATICS IN GENETIC AND PROTEIN ANALYSIS

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to the uses and applications of modern bioinformatics in elucidation of proteinand genetic information using both theoretical and practical approaches

Syllabus: Overview of bioinformatics. The generation of DNA sequence data, using sequence analysis, manual and automated DNA sequencing. Gene structure in eukaryotes, archaebacteria and prokaryote. The genome projects. Using the web for DNA and Protein analysis. Accessing bioinformatics databases, EMBL. GENBank and DDJ and the PDB. Searching databases using SRS or Query. Searching with a sequence û the Blast tools for homology searching. Predicting and confirming an ORF, control region identification, intron identification. Analysis of protein sequences derived from genetic information. InterProscan, patterns, sites and structure within proteins. The concept of motifs and domains. Alignment of sequences using CLUSTAL. Phylogenetic analysis for comparative sequence analysis. Functional prediction. Protein secondary and tertiary structure . Protein modelling. Swiss PDB viewer as a tools for molecular modelling. Genomics and proteomics tools. Microarrays and proteomics databases.

Prerequisites: BC4904, BC4905

CG4017 - BIOPROCESS ENGINEERING 2

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: The purpose of this module is to introduce students to more advanced aspects of bioprocess engineering, building directly on the fundamentals covered in CG4003. The students will be informed on mass transfer, advanced biochemical kinetics, heat transfer specific to bioprocessing, mass balance, stoichiometric analysis relevant to bioprocessing, downstream processing unit operations, and emerging technologies in bioprocessing. In addition, the students will complete practical experiments relevant to course content, use Polymath to solve biological rate expressions and construct a process flow sheet for a biological process using SuperPro software.

Syllabus: Bulk mass transfer effects in fermentation systems. Factors affecting oxygen mass transfer in aerobic fermentations. Measurement of kLa using static and dynamic methods. Control of kLa using correlations with agitator power and other operational variables. Heat transfer in biochemical systems. Heat exchanger design in bioprocessing units.

Bioreactor sizing and design for the following reactor types: fed batch, stirred fermenter, bubble column, airlift, packed bed, fluidised bed, trickle bed, and perfusion. Bioreactor scale-up. Operation and feeding regimes: chemostat with recycle, fed batch operation, and multistage reactors. Control methods: feedback, indirect metabolite control, programmed control, and emerging AI-based methods. Modelling and simulation of bioreactors.

Bioreaction product separation processes including: cell disruption, solvent extraction, adsorption, filtration, and centrifugation.

Final product purification methods: gel filtration, process chromatography, protein crystallisation, spray drying, and lyophilisation.

Regulatory and licensing systems in the pharmaceutical, biopharmaceutical, and biotechnology industries.

CH4007 - ORGANIC PHARMACEUTICAL

CHEMISTRY 1

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To build on the functional group chemistry covered in CH4102, CH4103 and CH4104. To impart to the student a detailed understanding and working knowledge of the applied use of organic compounds as pesticides and as medicinal drugs with an emphasis on mode of action at the molecular level and on the synthesis of selected structures.

Syllabus: Insecticides: The role of acetylcholine and acetylcholinesterase (AChE) in nerve impulse transmission; organophosphates and carbamates: Malathion, parathion and carbaryl, synthesis, mode of action as inhibitors of AchE. Herbicides: 2,4,5-T and 2,4-D, synthesis, nucleophilic aromatic substitution reactions, dioxin formation; mode of action as auxin analogs. Antibiotics: sulfonamides, synthesis, mode of action; penicillins: role of transpeptidase enzymes in bacterial cell wall synthesis, mode of action of penicillins as inhibitors of transpeptidase enzymes, synthesis of semi-synthetic penicillin stuctures. Analgesic and antiarthritic compounds: aspirin, ibuprofen and naproxen, synthesis of naproxen, resolution and racemisation aspects. Review of functional group chemistry.

Prerequisites: CH4007

CH4407 - PROCESS TECHNOLOGY 4

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Prerequisites modules on mass balances, thermodynamics, and fluid/heat transfer

Chemical Sciences

Rationale and Purpose of the Module: - To provide the student with a broad understanding of the principles of mass transfer and its applications - To enable the student to develop expertise in the analysis and design of separation processes. To give the student practical experience in the operation of separation processes.

Syllabus: Mass Transfer, diffusion in gases and liquids, laws of diffusive flux, mass transfer in solids, unsteady state mass transfer. Mass transfer across phase boundaries, mass transfer coefficients.
Separation operations, vapour-liquid systems, plate and packed columns, McCabe - Thiele plots, equilibrium stages, stage efficiencies, HETP and HTU.NTU approaches to packed column design. Distillation continuous and batch. Gas absorption and stripping. Use of triangular composition diagrams, leaching and liquid - liquid extraction, mixer-settlers. Evaporation, forward and back- feed operation, efficiency.

CH4417 - PHARMACEUTICAL FORMULATION

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To draw on a knowledge of basic physical chemistry and chemical unit operations in order to understand the efficient design and formulation of medicines as well as the manufacture of these medicines on both a small (compounding) and a large (pharmaceutical technology) scale.

Syllabus: Physical Chemical principles of dosage from design Particle science & powder technology Biopharmaceutics
Dosage form design & manufacture

Prerequisites: CH4003, CH4004, CH4005, CH4405, CH4415

ER4407 - ENVIRONMENTAL MANAGEMENT 1

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To understand the relationship between economic development and the environment: The evolution and contemporary application of the concept of

environmental management. The interaction between nature, society and enterprise.

Syllabus: An understanding of the nature and significance of local, national and global environmental issues and challenges, and their historical background. A grounding in the main elements of recognised environmental management systems (ISO 14001) and the issues involved. An understanding of the concept of sustainable development and its importance.

ER4507 - EFFLUENT CONTROL - WASTE MANAGEMENT 1

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To develop the students' knowledge and understanding (qualitative and quantitative) of the fundamental principles and processes underlying wastewater treatment, including the impacts of wastewater pollution on the receiving environment in the context of sustainable development.

Syllabus: General introduction to wastewater treatment, wastewater sources and characteristics, sampling and testing key pollutants, legislative framework, assimilative capacity and pollution impacts on the receiving environment, kinetics of biological growth, unit treatment processes including preliminary (screening, grit removal, flow measurement and sampling), primary (sedimentation), secondary (activated sludge, nutrient removal, passive treatment, high rate treatment processes), tertiary (polishing filters) and sludge (thickening, dewatering, drying, stabilisation techniques, aerobic / anaerobic digestion) treatment processes. Anaerobic processes (stabilisation ponds).

ER4627 - Safety and Industry

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To provide an understanding of the principles of accident causation and prevention in the workplace. To familiarise the student with hazard and process safety analysis techniques as practised in industry.

Syllabus: Principles of accident prevention; accident causation modes, risk identification, evaluation and control, hazard reduction techniques, design out, safety devices, warning devices. Hazard analysis, HAZAN, frequency, consequence, ALARA, Fatal Accident Rate, Hazard rate. Process Safety Analysis, HAZOP, guide words, what if reports, Fault tree analysis, primary and intermediate events, gate symbols, transfer symbols, Fire & explosion Indices. Fire safety management, current legal requirements, fire hazard identification, and risk assessment, active and passive fire protection, safe operating procedures, fire training, information and communication. Selected industrial case studies.

ER4707 - MONITORING AND RESEARCH METHODS

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: To familiarise the student with the chemical and physical nature of a broad range of pollutant types which are currently of environmental concern.

To facilitate the student in understanding the nature of environmental sampling and the industrial origin of specific pollutants and associated environmental impacts.

Assessment of sampling technologies covering a range of environmental samples from a variety of media including air, soil, surface water and groundwater.

Development of the students' working knowledge of industrial and ambient monitoring techniques on a practical and quantitative basis.

Syllabus: [Emissions & Impacts] industrial plant emissions û sources û emissions impact assessment methods û primary/secondary/tertiary/quaternary systems. [Groundwater Pollution] subsurface environment, groundwater movement, sources of

pollution, point sources û diffuse sources û microbial activity. [Pollutant transport in groundwater], non-aqueous phase liquid pollution (NAPL) / (DNAPL). [Groundwater Monitoring Wells] construction û design. [Sampling Groundwater] well depth measuring û well evacuation û sampling. [Analysis of Groundwater] techniques. [Surface Water Pollution] emissions to water, water quality monitoring, water quality assessment. [Atmospheric Pollution] odour, SOx, NOx & Acids, organics, temperature pressure, humidity, molar volumes, converting ppmv to mg/m3, STP/NTP - time weighted averages, dust, USEPA methods, isokinetic sampling methods

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CG4007 - SUSTAINABLE ENERGY PROCESSES

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

Chemical Sciences

Rationale and Purpose of the Module: • To give a deeper and wider knowledge in various energy apply the hazard and operability study (HAZOP) technique to sustainable energy processes.

Syllabus: • Introduction to sustainable energy processes/ systems • Order of magnitude analysis/ back of the envelop calculations • Overview of energy conversion/generation process fundamentals • Combustion of fossil fuels • Energy balances/ efficiency • Energy sources • Natural gas, Biomass, Wind • Oil, Coal, Nuclear, Solar, Ocean, Geothermal • Energy carriers & storage • Newer energy conversion and generation ideas • Procedures for sustainability assessment of industrial processes including the sustainability metrix as prescribed by the professional organisation IChemE. Energy conservation and environment protection. Health, safety and security issues; preventive measures. Industrial process simulation and sensitivity analysis of chosen design process. Graphical presentation. • Inherently safer design principles. • The application and use of HAZOP. • Principles of inherently safer design • Process safety management model • Hazard &

Computer Science Year 1 Modules

CS4031 - INTRODUCTION TO DIGITAL MEDIA
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Limited places available: 20
Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to some of the seminal developments in technology and to provide them with a historical perspective on how these developments have impacted on human development.

Syllabus: The influence of technology on cognition and activity; An overview of conceptual development of computer media.
The relationship of Technology to Practice, Form, Content and Remediation. Case studies will consider the influences, consequences and interrelationship of media and thought, including examples from the world of work, education, video games, social media, ubiquitous computing, personal fabrication and so forth.

CS4171 - PROGRAMMING FOR ARTIFICIAL INTELLIGENCE
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: The module explores several key concepts relating to artificial intelligence (AI) algorithms and their implementation. Algorithms which have inspired a diverse range of technologies such as those used in game playing and natural language processing. The aim of this module is to provide students with an understanding of not only some principal AI algorithms, but also how to encode them in a given programming language (with the programming language and its operating environment to be selected by the Department and the selection to be reviewed regularly).

Syllabus: Programming for Artificial Intelligence is a module which teaches students how to think logically about several key AI related problems. To conceptualise solutions which can then be specified as well designed algorithms and subsequently implemented in a predetermined programming language. AI topics covered include, tree and graph search, knowledge representation, classification, and navigation, while programming topics covered include: declaring and using variables and data structures; looping; encapsulation; functions and flow control; processing input; generating output. Programming for Artificial Intelligence offers students an opportunity to tackle a set of well-defined problems, using the knowledge they have gained of AI algorithms and their implementation as programs.

CS4001 - COMPUTER APPLICATIONS FOR SCIENTISTS 1
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module:
To provide the student with a practical and comprehensive set of skills for the acquisition, management, manipulation, and presentation of scientific information. This module is entirely practically based, with the emphasis on information technology applications in the areas of chemistry, biochemistry, environmental science and health & safety.

Syllabus: - Scientific literature retrieval - use of Internet/Intranet databases e.g. Science Direct, ASTI, Medline, Ullmanns and OHSIS. - Presentational skills: (i) Scientific drawing - use of a chemical drawing package (e.g. ChemSketch) to produce 2- and 3-d representations of molecular structures; (ii) Scientific graphing - use of e.g. Advanced Grapher to create professional quality

graphs. Computer-aided audio-visual presentations using MS Powerpoint. - Rudiments of spreadsheets: entering names, numbers and formulas into cells; calculations and simple formulae; display of equations in the spreadsheet; editing, deleting, copying and pasting cell contents; formatting cells in a spreadsheet; relative and fixed (absolute) cell references; ordering data within spreadsheets; creating and embedding charts and graphs; saving and formatting for printing; - Built-in functions for summarizing and evaluating data e.g. count, sum, minimum, maximum, average, mode, median, standard deviation, frequency, permutations and combinations, geometric mean, harmonic mean, probability and distributions, regression analysis; - Descriptive statistics: ranking by percentile, calculating moving averages, exponential smoothing, generating random numbers, sampling data; - Importing and Exporting Data: Import/export data from/to another file, e.g. a text file, a web page. - Pivot tables and pivot charts; - Creating Macros; - Introduction to Visual Basic for spreadsheet applications in chemistry, biochemistry, environmental science and health & safety.

CS4012 - REPRESENTATION AND MODELLING
ECTS Credits: 6 (Year 1 Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: This module aims to provide students with an understanding of how different kinds of phenomena are represented as digital information. Its objectives are to give students an appreciation of the role of software in rendering and manipulating digital representations, and an introduction to the skills and techniques of abstract representation (modelling) of social and economic phenomena. (4) Removed LM051 B.Sc. Computer Systems and LM110 B.Sc. Computer Games Development from the list of programmes offering this module as they now serve as denominated programmes for LM121.

Syllabus: What is a representation? the represented world, the representing world and the mapping between the represented and representing world; intrinsic versus extrinsic mappings; Representing information in various forms of media (images, graphics, video, audio and text); characteristics of multimedia data; hypertext and hypermedia; document content and structure; content model; semantic structure; metadata and metatags; modelling media objects; modelling correlations among media objects; simulation versus animation; What is a model? model criteria: mapping criterion, reduction criterion, pragmatic criterion; models versus real systems; abstraction and similarity; iconic, analogic and symbolic models; static and dynamic models; descriptive and prescriptive models; metaphor as a special type of model; purposes of models; Analyzing social, biological and business phenomena, in order to design and construct models of those phenomena, using spreadsheets and databases; Models in software development; use of descriptive and prescriptive models; risks associated with model usage; formal approach to building models; problem conceptualization; collection and examination of data; model structure, content and layout; development and use of macros; model validation and documentation; developing model templates.

CS4061 - MEDIA PROGRAMMING 1
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: This module will familiarise media students with computer programming and make them aware of how it can be of benefit to them in their careers. Students will learn how to write their own programs to manipulate images.

Syllabus: Students will be introduced to programming and algorithmic thinking. They will learn to create and manipulate visual objects, both vector and raster-based, and introduce user interactivity. They will be taught how to be creative with coding, how to conceptualise and then realise their objectives. Students will progress to apply this

knowledge to develop complex interactive projects. Students will be developing algorithmic thinking, which will provide a base level of understanding that can be built on in later modules.

CS4131 - INTRODUCTION TO SCIENTIFIC COMPUTATIONS 3

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: Many students entering UL to study science courses do not have computer science knowledge. The rationale of this module is to introduce all students to the basic concepts of how to represent data and computations relevant to their area of study in modern scientific computing systems. This encompasses both modelling and execution. Note: This module could be carried out in conjunction and close collaboration with the "Laboratory Calculation" module.

Syllabus: 1. Modelling and representing data and operations on data 2. Introduction to core scientific data types and data manipulation operations 3. Introduction to scientific workflows 4. Use of appropriate software tools to model and execute scientific computations pertinent to the area of study 5. Solving simple problems - presentation of the design and solution.

CS4141 - INTRODUCTION TO PROGRAMMING

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: To provide a language independent introduction to programming using one programming language - the programming language and its operating environment is selected by the Department and the selection is reviewed regularly.

Syllabus: a. Programming process: understanding the problem, planning the logic, designing the solution, code the program, translate the program into machine language, test the program; syntax and semantics. b. Declaring and defining variables/data; primitive data types; constant definitions; mixed data types; arithmetic expressions and precedence; assigning statements. c. Relational expressions, logical expressions and precedence; selection statements; problem solution considerations; data validation; error handling. d. Looping constructs; problem solution considerations. e. Introduction to classes, objects and encapsulation. f. Modules, subroutines, procedures and functions; flow of control; design considerations; library functions; user defined functions; local and global variables; scope, visibility and lifetime of variables/data; actual and formal arguments/parameters. g. Desk checking solutions; dry running code; writing self-checking code; systematic debugging approaches. h. One dimensional arrays and their manipulation. i. String manipulation j. Input and Output.

CS4221 - FOUNDATIONS OF COMPUTER SCIENCE 1

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module:

To understand the mathematical basis of many complex computations, to lay a basis for derivation of simple programs from formal specifications, and to understand the dependence of program on underlying evaluation mechanisms.

Syllabus: Relation between computer science, computation, and computers, illustrating logical dependence of computations from electronic computers. Programming as a specification of a computation, and its dependence on evaluation mechanisms; - Arithmetic operators and syntax using infix, outfix, prefix, superfix, subfix and so forth. Evaluation of complex arithmetic expressions. - Scope of operations and requirement to grouping operands. Linear notation restricted to infix, prefix, postfix forms, and conventions to specify relative priority/precedence of operators. Syntax trees and their use in the determination of ordering of computations. Use of lambda notation, and

representation in syntax trees. - Conditional expressions. Function definitions, and simple recursive definition. Common features of programming languages (notations) and their relationship to mathematics including notion of types as sets of values, instances of a type as values. - Packaging code fragments into functions to simply handling nested inductive definitions and unpackaging inner functions into code fragments to yield conventional implementations of nested loops.

CS4231 - GRAPHIC DESIGN

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to the principles and practices of two-dimensional graphic design (screen and print) within the context of a process-driven workflow.

Syllabus: This module provides an introduction to 2D graphic design through the creation of a digital portfolio. This process emphasises organisation, workflow, and design thinking. Visual perception is considered in terms of Gestalt theory. Colour is described in the context of different technical models, but also in terms of psychology and cultural context. Topics include an overview of typography (history, form, function), approaches to page proportion in terms of visual harmony, and digital image types (raster and vector).

CS4911 - INTRODUCTION TO INFORMATION TECHNOLOGY

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: This module is designed to give 1st and 2nd year students from disciplines other than Computing a historical and theoretical introduction to information technology: concepts, terminology and possible future developments; together with practice in standard productivity software.

Syllabus: This module is designed to give 1st and 2nd year students from disciplines other than Computing a historical and theoretical introduction to information technology: concepts, terminology and possible future developments; together with practice in standard productivity software. - Concepts of information technology. - Data and information. - Software: general purpose applications, operating systems features, programming development languages, HTML; proprietary software and Open Source Software. - Hardware: types of computers, input/output devices, CPU, memory and secondary storage û disks and solid state memory. - Development of the PC. - Communications and connectivity: modems, communications channels, networks: LAN, WAN. - The Internet and the Web: access, browsers, URLs, search engines, multi-media. - Security issues: virus, firewall, proxy server. - Computers and society: dependence of society on computers, development of WP, e-commerce, the WWW impact on the media and advertising. - Future hardware and software developments. - Word Processing and spreadsheet practice. - Data representation. - HTML exercises.

CS4928 - THEORY AND PRACTICE OF SOFTWARE DESIGN

ECTS Credits: 6 (Year 2 Module)

ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE - UPDATES ARE IN PROGRESS – Please visit Book of Modules

Computer Science & Information Systems

Rationale and Purpose of the Module:

Syllabus:

Computer Science Year 2 Modules

CS4004 - SOFTWARE TESTING AND

INSPECTION
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to software testing and inspection such that when given a specification and an implementation of a program, the student would be able to write the tests, run them, and report on the errors found.

Syllabus: - Key Terminology: testing, debugging, error, bug, defect, quality, risk, mean-time between failures, regression testing, limitations of testing; - Test types and their place in the software development process; - Black-box and white-box testing; - Program reading and comprehension; - Refactoring code; - Inspections, walkthroughs and desk-checking; - Programming with assertions; - Using a debugger for white-box testing; - Reporting and analysing bugs: content of the problem report, analysis of a reproducible bug, making a bug reproducible; - Test case design: characteristics of a good test, equivalence classes and boundary values; - Expected outcomes, test case execution and regression testing; - Requirements for white-box and black-box testing tools;
Prerequisites: CS4013

CS4013 - OBJECT ORIENTED DEVELOPMENT
ECTS Credits: 6 (Year 2 Module) To be confirmed
Computer Science & Information Systems

Rationale and Purpose of the Module: On successful completion of this module students will be able to identify, design, code and construct systems using inheritance hierarchies, encapsulation and polymorphism to solve specified programming problems.

Syllabus: Key terminology: objects, attributes, behaviours, states, classes, instances, associations; abstraction, inheritance, generalisation/specialisation, parent (base/superclass/ancestor) and child/children (subclass/descendant) classes, encapsulation/information hiding, polymorphism, message passing, dynamic binding; Problem solving using a procedural approach versus an object oriented approach; Representing classes, objects, attributes: build generalisation relationships; define is-a relationships; divide into superclasses/subclasses; build associations between classes; draw an analysis-level diagram; Methods: method definitions; static keyword; location of methods; arguments/parameters; method invocation; return types; method modifiers; Classes and objects: defining classes, member variables and member methods; access modifiers; creating and destroying objects/instances; class and instance variables, static variables; object values including predefined object values (null, this, super); Constructors: constructor method; overriding defaults; sending arguments; overloading methods including constructor methods; overriding a method; blocks and scope; Exceptions: how to handle exceptions/errors; the throw clause; try, catch and finally blocks; rethrowing an exception; Extending classes: abstract classes; nested classes and interfaces; interfaces and polymorphism; constructors in extended classes, constructor phases; single inheritance versus multiple inheritance; single inheritance of implementation; accessing and initialising superclasses; named and anonymous inner classes; member and local inner classes; iteration, exception-safety and delegation idioms based on inner classes;
Prerequisites: CS4222

CS4019 - DIGITAL ARTS 1
ECTS Credits: 6 (Year 2 Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: This module is an introduction to the wide range of art types and practices which make up the digital arts. It contextualizes the aesthetics and modes of approach of the digital arts by presenting the historical development of post 19th Century art practices and technologically mediated art forms. It evaluates these forms from a range of theoretical

and practical vantage points thereby providing a perspective from which students can critically relate to the digital arts in general as well as to their own practice.

Syllabus:

- Video Art
- Film Theory
- Installation and Interactive Art
- Electronic and Experimental Music
- Digitally Enabled Sculpture
- Sound Art

CS4023 - OPERATING SYSTEMS

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: On successful completion of this module a student should have a clear understanding of the (1) Logical structure of, and facilities provided by,
a modern OS
Concepts of processes, threads and
multithreading and how they are implemented in a modern OS
Problems that arise when processes collaborate and compete and well as being able to demonstrate practical experience of mechanisms for handling these situation (4) Different ways of implementing virtual memory

(5) Use of system calls

Syllabus: (1) Positioning the operating system (OS) between the user and the hardware; the need for the OS; different types of OSs; interfaces to an
OS and the interface with the hardware; (2) The concept of a process and a thread; representation of processes and threads; process and thread state; process creation and termination; thread creation, scheduling and termination; multithreading; (3) Scheduling; context switching; concurrency, including interaction between threads; (4) Inter process communication (IPC); synchronization and mutual exclusion problems; software algorithms for IPC; 2 processes, n processes;
(5) Low and high level mechanisms for IPC and synchronization: signals; spinlocks; semaphores, message passing and monitors; deadlock; use of semaphores for synchronization, mutual exclusion, resource allocation; implementation of semaphores; use of event counts and sequencers for classical IPC problems; conditional critical regions; monitors and condition variables; (6) Physical and virtual memory; address translation; base and length registers; segmentation and paging; cache memory; system services for memory management;
I/O subsystem, directory name space; inodes; synchronous and asynchronous I/O; locking; buffering;
File systems and file management; file system types; disk organization; mounting a file system; device drivers; file system based IPC; pipes; the socket mechanism; IPC using sockets;
Fault tolerance and security;
Prerequisites: CS4211

CS4053 - DIGITAL VIDEO FUNDAMENTALS

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

Limited places available

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to the principles and technologies applied to digital video representation and recording.

Syllabus: Introduction to principles of digital video representation and recording. Principles of Digital Signal Processing for video including sampling theory and hue, saturation and intensity representation. Selection and use of digital video cameras. Digital video formats, compression techniques, connectivity and standards.
Principles of digital video colour representation.
Introduction to digital
video display and projection.
Digital video image capture.
Introduction to digital video editing.

High-definition digital video. Introduction to CGI. Digital video distribution.
Audio technology for video.

CS4083 - SOUND SYNTHESIS
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: To develop knowledge and competence of digital media systems. (Existing module CS4063 "Digital Media Software & Systems 2" is part of a suite of modules core to both LM113 (Digital Media Design) and LM114 (Music, Media & Performance Technology). The course board has decided that the titles of this suite of DMSS modules do not adequately describe the course content and therefore wish to change the titles to better communicate the content. The content itself of these modules remains the same - only the title itself is changed.)

Syllabus: To develop knowledge and competence of digital media systems:
A survey of sound synthesis techniques from early electronic music to contemporary signal processing Creation of synthesis techniques in industry-standard software. Examination of additive synthesis, modulation synthesis and contemporary techniques 4. Basics of frequency-domain processing 5. Real-time computer methods for sound design and processing
6. Aesthetics and development of sound design and processing.

CS4084 - MOBILE APPLICATION DEVELOPMENT
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited places available: 4
Computer Science & Information Systems

Rationale and Purpose of the Module: The module will focus on the tools and environments that exist to help developers create real world applications that run on wireless and mobile devices. A strong emphasis will be placed on providing students with hands on experience in the programming and testing of applications for mobile devices. Throughout this module students will use an object oriented programming language, basic APIs and specialised APIs to develop applications for mobile devices.

Syllabus: Challenges to be faced when developing applications for mobile devices. Platform specific mobile applications and/or mobile web applications; mobile application lifecycles. Mobile applications and their architectures. Overview of operating systems (OSs) and Application Programming Interfaces (APIs) to choose from when developing applications for mobile devices. Comparison of native development environment options; software development kits (SDKs) and emulators. Installing and configuring the development environment. Managing application resources; designing user interfaces; data storage and retrieval options; synchronization and replication of mobile data. Communications via network and the web; networking and web services; wireless connectivity and mobile applications. Performance consideration: performance and memory management; performance and threading; graphics and user interface performance; use various facilities for concurrency. Security considerations: encryptions, authentication, protection against rogue applications. Location based application; location API. Packaging and deploying applications for mobile devices.

CS4093 - GAMES FOR GLOBAL MARKETS
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Note: There is no limit on students in this module, but there is a limit to how many can join a lab session due to licenses. Usually no more than 20 students in a lab. So if a substantial number of students join, additional lab sessions need to be scheduled.
Computer Science & Information Systems

Rationale and Purpose of the Module: To examine the processes by which games are developed with a view of global markets, and the considerations needed for successful implementation of the principles.

Syllabus: General overview of localisation, internationalisation, global markets, phases Culturalisation of game content: why it matters, geopolitical and cultural forces, strategies Software ratings and rating bodies Localisation-friendly development and internationalisation Organising assets, integrating assets
Localisation tools and processes
Localisation kits, localisation testing

CS4913 - BUSINESS INFORMATION SYSTEMS
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Computer Science & Information Systems

Rationale and Purpose of the Module: Almost all business organisations use computerised information systems to some degree. many business organisations would not be able to function without such systems. At the same time there are continuous occurrences of problems in the design, implementation and use of these systems. This module introduces students on a range of business studies courses to the fundamental features of business information systems (BIS). The main purpose is to enable graduates of such course appreciate the need for BIS, how BIS can aid the decision making processes of an organisation and how the design of such systems is fundamental to their eventual success or failure.

Syllabus: - Importance of information systems management in business. - Differentiate between information and data. - Using information to aid decision making in business. - Data management. - Features and functional components of relational databases. - Role of the database in business information systems. - Components of a Business Information System (BIS) including hardware and software components. - Introduction to systems development methodologies. - Development of computerised business information systems using system life cycle methodology management of BIS. - BIS strategy and how it creates business advantage. - Legal and ethical aspects of the design and use of BIS. - Construction of a simple relational database using MS Access.

CS4103 - USER RESEARCH METHODS
ECTS Credits: 6 (Year 2 Module)
Computer Science & Information Systems

Rationale and Purpose of the Module:
The main objective of this module is to promote a good understanding of user research methods and how to correctly apply them as part of the interaction design process. The knowledge and skills acquired will be applicable to other modules, including the Final Year Projects and will improve graduates' employability prospects in multiple sectors.

Syllabus: This module provides an introduction to a range of user research methods. Students learn to appreciate the variety of methodological techniques, how to judge which are appropriate to particular research problems and how to identify the merits and limitations of different types of research design. This module covers: user research design; qualitative methods; analysing qualitative data; quantitative methods; analysing quantitative data; social and ethical issues in user research; presenting and dissemination research.

Computer Science Year 3 Modules

CS4025 - DIGITAL AUDIO FUNDAMENTALS
ECTS Credits: 6 (Year 3 Module)
Note: Equipment constraints, may have limitations on numbers.
Computer Science & Information Systems

Rationale and Purpose of the Module: An introduction to digital audio aimed toward preparation for studio applications.

Syllabus: Nature of analog and digital sound; Principles of digital signal processing for audio including sampling theory and spectral representation, digital sound synthesis techniques; Digital audio recording techniques including selection and use of microphones; Multitrack recording; Manipulation of digital audio files; Digital audio andcompression; Digital audio distribution including storage, internet and digital audio broadcasting.

CS4071 - VIRTUAL AND AUGMENTED REALITY DESIGN

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Limited places available: 4

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will enable the students to develop bespoke Augmented and Virtual Reality scenarios, using pre-built software pipelines, working to specific industry standards. As part of this, students will learn about the use of virtual reality technologies, as a means to create client-focused training simulations, guided tours and interactive user-focused experiences, wherein leveraging of sound-effects and spatial immersion are key modalities.

Syllabus: 1. Syllabus: - Features of game engine technologies that can be leveraged to prototype and create bespoke virtual scenarios. - Design considerations for virtual learning and spatial immersion scenarios in both 3D and 2D contexts: scenario-related dimensions, interaction-related dimensions, user-related dimensions, data/content related dimensions and communication-related dimensions. - Considering the societal impact of virtual reality, through learning theories of virtual learning, education, embodied experience and digital narratives. - Learn industry and government specifications and regulations in virtual reality design, for healthcare, manufacturing and recruitment/training. - Embedding accessibility features, for specific clients and users. - Creation of sound and spatialisation effects that aid in the user's sense of immersion. - Designing and prototyping for specific headset hardware such as Oculus, Vive and Rift, whilst working with cross- platform compatibility features in mind. More generally looking at 2D apps, 3D games or other types of content. - Managing of a virtual scenario with a pre-existing software pipeline, eliminating the need for memory allocation, or specific programming, beyond what already is controlled by the pipeline. - Learning to develop and prototype virtual scenarios collaboratively, as part of a team with different skills, sticking to tight deadlines.

CS4085 - COMPUTER GRAPHICS II - TOOLS AND TECHNIQUES

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: Increase competence of student in the area of modern real-time computer graphics. This includes usage of Content Creation Suites, 3D Engines and combining available tools into a working tool chain. This is a follow on module to CS4815 which introduces more advanced graphics techniques and special effects.

Syllabus: - Basic Modelling Techniques
Basic Animation Techniques
Usage of Content Creation Suites
Graphical File Formats (importing / exporting)
Introduction to Real-Time 3D Engines
Scene Management Techniques
Special FX
Particle Systems
Pixel/Vertex Shaders
Prerequisites: CS4815

CS4096 - ARTIFICIAL INTELLIGENCE FOR GAMES

ECTS Credits: 6 (Year 3 Module)

(Lab-Based Module)
Limited places available: 5-6
Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of the module is to provide the students with a foundation in the principles and applications of Artificial Intelligence methods as applied to Games and Game Development.

Syllabus: Review of basic AI technologies and principles, and how they can be employed in computer, board, and embodied games. Comparison between mainstream AI and game AI. Specific topics addressed include pathfinding in games, heuristic search in game playing, map representational mechanisms, and character decision making. Areas of agent learning including reinforcement learning as applied to games will be introduced. Other topics of interest include procedural content generation and general game AI. The related areas of artificial life and robotics will be touched upon. Prerequisites: CS4006

CS4106 - MACHINE LEARNING: METHODS AND APPLICATIONS
ECTS Credits: 6 (Year 3 Module)
Limited places available: 4
Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of this module is to familiarise students with a targeted subset of the principles and methods involved in machine learning, focusing mainly on the field of evolutionary computation and associated paradigms.

Syllabus: Following an overview of general machine learning methods and applications, the goal is to provide students with an understanding of the basic principles, methods and application domains for evolutionary computation. Students
will be introduced to a broad range of evolutionary computation techniques including genetic algorithms, genetic programming, and grammatical evolution. Different representational mechanisms including binary, Gray, real-valued and e-code will be discussed. Different approaches to the mutation and recombination operators will be presented. Fitness function types and interactive evolutionary computation will be introduced. Depending on the particular expertise of the lecture involved in delivery of the module particular emphasis may be placed on application to areas such as neuroevolution, evolutionary robotics (including evolutionary humanoid robotics), automatic program synthesis, the parallelisation of sequential programs, and financial modelling and prediction. Potential societal, ethical and philosophical implications of advanced AI/ML technologies will be outlined.

Prerequisites: CS4006

CS4151 - DIGITAL MODELLING AND ANIMATION
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited places available: 4
Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of this module is to teach students the skills they need to produce 3D digital animation, models and filmmaking content of a quality that will enable them to develop instructional content, promotional videos and advertisements for their own projects, or for. industry clients. The key emphasis of the module is on learning the applied, vocational skills and to leverage 3D tools to design scenarios focused on user experience, interaction, explainability and usability. As part of this approach, students will be encouraged to develop their learning in an applied, continuous, progressive fashion, by keeping a development diary and portfolios to promote themselves to prospective employers.

Syllabus: The module will include the following: • Features of a 3D Modelling Integrated Design Environment (IDE) tools, such as Maya, 3DS MAX and Blender, that can be used to make short pieces of animation, models and promotional content, such as ads and/or instructional videos. • Design

considerations for 3D models to be employed in animation projects, or used in advertisements and instructional videos. • Considering the key tool-based approach to the animation pipeline: as part of this the module students will cover poly- modelling and sculpting techniques, rigging models, keyframing and producing films from their content in film-editing software. • In addition to animation, students will look at advanced material effects: specifically, use of Shaders and Node Editors inside 3D Modelling IDE's, UV Mapping and Textures, Lighting Effects, Raytracing, Rendering and Compositing.• Learn industry specifications for interaction-design and user-focused technology. • Work also on film projects that may use CGI elements, or require Visual Effects expertise. • Consider visual narrative filmmaking and ways of telling stories. • Knowledge of working with specific tools and how best to leverage specific tools for creating a particular story, or conveying a specific message. • Keep portfolios as a way to promote work and enhance employability prospects. • Key focus on the conditions of work inside an interaction-design focused company and fostering an ability to prepare for entry-level skill-based performance tests, in such companies.

CS4416 - DATABASE SYSTEMS

ECTS Credits: 6 (Year 3 Module)

Limited places available: 2

Computer Science & Information Systems

Rationale and Purpose of the Module:

Databases, particularly relational databases and database management systems (DBMSs) are central in the design and development of modern information systems. Understanding of their structure and skills in their application are fundamental aspects of a proper foundation in any domain of software development.

Syllabus: The concept of a DBMS and DB Architectures are introduced. This module will build upon the notion of a database as introduced in Information Modelling and Specification including revision of those concepts previously introduced, i.e. the relational data model, including issues, such as Integrity Constraints, SQL, and Views.
Concepts of databases and DBMSs;
Database Architectures;
Revision of the Relational Model; SQL Tables, Views and the DDL; Referential and Existential Integrity Constraints;
Normalisation: Functional Dependencies; 1st, 2nd 3rd, 4th Boyce Codd and Fifth Normal Forms; - Technologies: Transaction Management; ACID properties; Security; Data Storage & Indexing;
Triggers & Active DBs; Query Optimisation;
Distributed Architectures;
Use of embedded SQL, cursors, triggers; - Object DBs and Object Relational DBs;
Data Warehousing, Decision Support & Data Mining;
Emerging Technologies; Prerequisites: CS4513

CS4151 - DIGITAL MODELLING AND ANIMATION

ECTS Credits: 6 (Year 3 Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of this module is to teach students the skills they need to produce 3D digital animation, models and filmmaking content of a quality that will enable them to develop instructional content, promotional videos and advertisements for their own projects, or for. industry clients. The key emphasis of the module is on learning the applied, vocational skills and to leverage 3D tools to design scenarios focused on user experience, interaction, explainability and usability. As part of this approach, students will be encouraged to develop their learning in an applied, continuous, progressive fashion, by keeping a development diary and portfolios to promote themselves to prospective employers.

Syllabus: The module will include the following: • Features of a 3D Modelling Integrated Design Environment (IDE) tools, such as Maya, 3DS MAX and Blender, that can be used to make short pieces of animation, models and promotional content, such as ads and/or instructional videos. • Design considerations for 3D models to be employed in

animation projects, or used in advertisements and instructional videos. • Considering the key tool-based approach to the animation pipeline: as part of this the module students will cover poly-modelling and sculpting techniques, rigging models, keyframing and producing films from their content in film-editing software. • In addition to animation, students will look at advanced material effects: specifically, use of Shaders and Node Editors inside 3D Modelling IDE's, UV Mapping and Textures, Lighting Effects, Raytracing, Rendering and Compositing.• Learn industry specifications for interaction-design and user-focused technology. • Work also on film projects that may use CGI elements, or require Visual Effects expertise. • Consider visual narrative filmmaking and ways of telling stories. • Knowledge of working with specific tools and how best to leverage specific tools for creating a particular story, or conveying a specific message. • Keep portfolios as a way to promote work and enhance employability prospects. • Key focus on the conditions of work inside an interaction-design focused company and fostering an ability to prepare for entry-level skill-based performance tests, in such companies.

Computer Science Year 4 Modules

CS4207 - ADVANCED PROGRAMMING CONCEPTS AND PRACTICES

ECTS Credits: 6 (Year 4 Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: None of the main programming paradigms have a precise, globally unanimous definition, nor official international standard. Nor is there any agreement on which paradigm constitutes the best method to developing software. This module provides a deeper understanding of some of the less well known programming paradigms. In particular is will focus on central programming concepts such as abstraction and representation as well as concepts such as parallel and concurrent execution. Particular emphasis on newer and emerging programming languages and industry trends will be an essential aspect of this module.

Syllabus: In the course of a career, a computer scientist will be confronted with many different programming languages and paradigms. To make informed design choices when selecting a particular language, they must understand the principles underlying how different programming language features are defined, implemented and be suited to different problem domains. Syllabus will include : Abstract Machines; Describing a Programming Language, Names and The Environment, Memory Management, Control, Abstraction; Models of concurrency and implementation.

Prerequisites: CS4115 , CS4076

CS4020 - INFORMATION SOCIETY

ECTS Credits: 6 (Year 4 Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: This module offers a socio-economic, political and cultural exploration of the "internet society". The course will provide a series of perspectives on the network society, examining its conceptual foundations, critiquing its more polemical exponents, and subjecting the claims of the electronic sublime to critical scrutiny. This module will help students understand some of the current debates in the media about the effects of information and communications technology on society. The module will help the student to develop critical thinking around key issues of the Information Society.

Syllabus: In this module, the students will cover a series of available approaches to the study and understanding of technological innovation and social change in the Information Society. In particular, the

module covers three main approaches to investigate issues related to the Information Society: technological determinism, social constructivism, and alternative theoretical approaches such as Actor Network Theory. The module will then cover a series of specific case studies regarding recent technological innovation and social change. Key issues of the Information Society (security vs. privacy; copy-right vs. copy- left) will be discussed through practical examination of selected case studies in different areas.

CS4059 - CREATIVE CODING
ECTS Credits: 6 (Year 4 Module) To be confirmed
Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to the design and development of interactive audio-visual artworks using low level coding.

Syllabus: This module will focus on the development of interactive audiovisual (a/v) artworks. Student will focus first on the analysis of existing a/v artworks. They will then create a concept, design and develop an interactive artwork using low level coding. Key topics include: 1. Low level programming (C++ and openFrameworks) 2. Use of Integrated Development Environment (IDE) - XCode 3. Real-time manipulation of audio elements by means of code (C++) 4. Real-time manipulation of video elements by means of code (C++) 5. Communication protocols for interconnection with third-party software (MIDI, OSC) 6. User responsive art installations.

CS4125 - SYSTEMS ANALYSIS AND DESIGN
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Limited places available: 4
Computer Science & Information Systems

Rationale and Purpose of the Module:

The development of large-scale complex software-based systems proceeds from analysis through design and implementation to system verification and validation. This module covers the analysis and design phases of the software development cycle with particular emphasis on the use of Object-oriented approaches to specification.

Syllabus:

- Software lifecycles: review of the waterfall model, prototyping, spiral, and object-oriented (OO) development models. - Focus on the Unified Software Development Process (USDP). - Characteristics of good software design - modules, cohesion, coupling or dependency, encapsulation, abstraction, etc. - Requirements investigation. - Requirements classification: functional and non-functional requirements. - Requirements modelling: use case diagrams and use case descriptions. - Computer aided software engineering (CASE). - Review of OO concepts: classes and objects, abstract classes, class interfaces, inheritance, polymorphism, etc. - Analysis using OO method and UML: identification of classes using key domain abstraction, CRC cards, collaboration and sequence diagrams, state transition diagrams, and activity diagrams. - Overview of object-oriented software architectures: layering and partitioning, open versus closed, MVC, broker, etc. - Design using OO method and UML: concurrency, object design, collection classes, GUI design, and data management design. - Additional diagramming notation: packages, subsystems, and implementation. - Analysis and design patterns. - Frameworks. - Other methodologies - DSDM, Agile approaches, Extreme Programming.

CS4178 - SOFTWARE REQUIREMENTS AND MODELLING
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Limited places available: 6
Computer Science & Information Systems

Rationale and Purpose of the Module: Introduce students to the requirement and modelling phases of a system's (and software) development cycle. Requirements and models as knowledge capture and materialization in analyzable IT artefacts. Requirments and models that support the needs to

change and evolution. Exposure to relevant methods, techniques and tools, exposure to case studies.

Syllabus: 1. Requirements in the traditional and in the agile/evolutive system and software development process. 2. Techniques for elicitation and discovery of requirements. 3. Relation between requirements and knowledge capture: formal and informal materialisations. 4. Abstract models and constraints as co-design tools with diverse stakeholders. 5. Relation between requirements, models, and testing. 6. Functional and non-functional requirements. 7. Models for system behaviour: formal models, verifiable models, executable models. 8. Requirements and model validation 9. Requirement and model review, refinement and evolution 10. Negotiation and agreement: organisational and social issues; co-design.

CS4287 - NEURAL COMPUTING

ECTS Credits: 6 (Year 4 Module**)**

(Lab-Based Module)

Limited places available: 4

Computer Science & Information Systems

Rationale and Purpose of the Module:

The objective of this module is to equip students with the fundamental knowledge and techniques necessary to effectively apply artificial neural networks to a wide variety of problems in a machine learning context, and correctly interpret the results.

Syllabus: Introduction to the computational model of a neuron. Models of Learning: Hebian, Boltzman, supervised, unsupervised, and reinforcement learning. Learning in the Perceptron and its limitations. Backpropagation in the Multilayer Perceptron. Cross validation, generalisation, over-fitting, and analysis of the output. Hopfield networks. Deep learning paradigms such as Convolutional Neural Networks, Long Short Term Memory, and Recurrent Neural Networks. Concepts such as Dropout and Batch Normalisation will be introduced. Reinforcement Learning paradigms such as Temporal Difference Methods and their implementation on neural architectures. Applications of neural computing to a wide range of domains. Examples include object identification and recognition in computer vision, financial prediction, synthesis of texts, simulated robot control. Implementations will generally use third party APIs. Topics: Radial-Basis Function networks, Self-Organising maps, Support Vector Machines.

CS4107 - PERFORMANCE TECHNOLOGY 2

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: Students will develop their knowledge of performance technology in the context of interactive environments for digital media through a combination of laboratory based small group project work and lecture based learning.

Syllabus: This module will focus on the use of electronic sensors and actuators in combination with software and PC based approaches in the development of performance systems and interactive environments. Key topics will include: The software and hardware development of a performance system. Implementing performance systems for multimedia (movement triggering, dance, installation, virtual spaces, enhanced environments). Implementing performance software for composition (composition with instruments and electronics, dynamic reactive audio and video playback).

CS4337 - BIG DATA MANAGEMENT AND SECURITY

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Computer Science & Information Systems

Rationale and Purpose of the Module: Introduce students to the challenges and practice in big data management and governance. The topics include overview of the Hadoop ecosystem, distributed file systems, big data programming models, scalable database systems solutions, data warehousing and big data security and protection.

Syllabus: 1. What makes big data "big"; sources of big data; the Vs of big data; data governance: accuracy, availability, usability and security; the impact of big data on industry and society. 2. Big data programming frameworks and systems: distributed file systems, scalable computing, the MapReduce programming model, the Spark programming and computing model, overview of the main components of the Hadoop ecosystem. 3. Database systems for big data: a. Scalable relational database systems: partitioning and sharding; example implementation in a current relational database system. b. NoSQL database systems for big data management: key-value, column-family, document-oriented and graph database systems; case study of a current NoSQL database system. 4. Data warehousing concepts: what is a data warehouse; role of a data warehouse in data management; architecture of a data warehouse; ETL: extraction, transformation, load process, data marts; operational systems vs. data warehouses. 5. Big data security and protection challenges and practices, such as privacy-preserving data composition, encryption, granular access control, user authentication models, endpoint filtering and validation, etc.

CS4297 - APPLIED SYSTEM DESIGN

ECTS Credits: 6 (Year 4 Module)

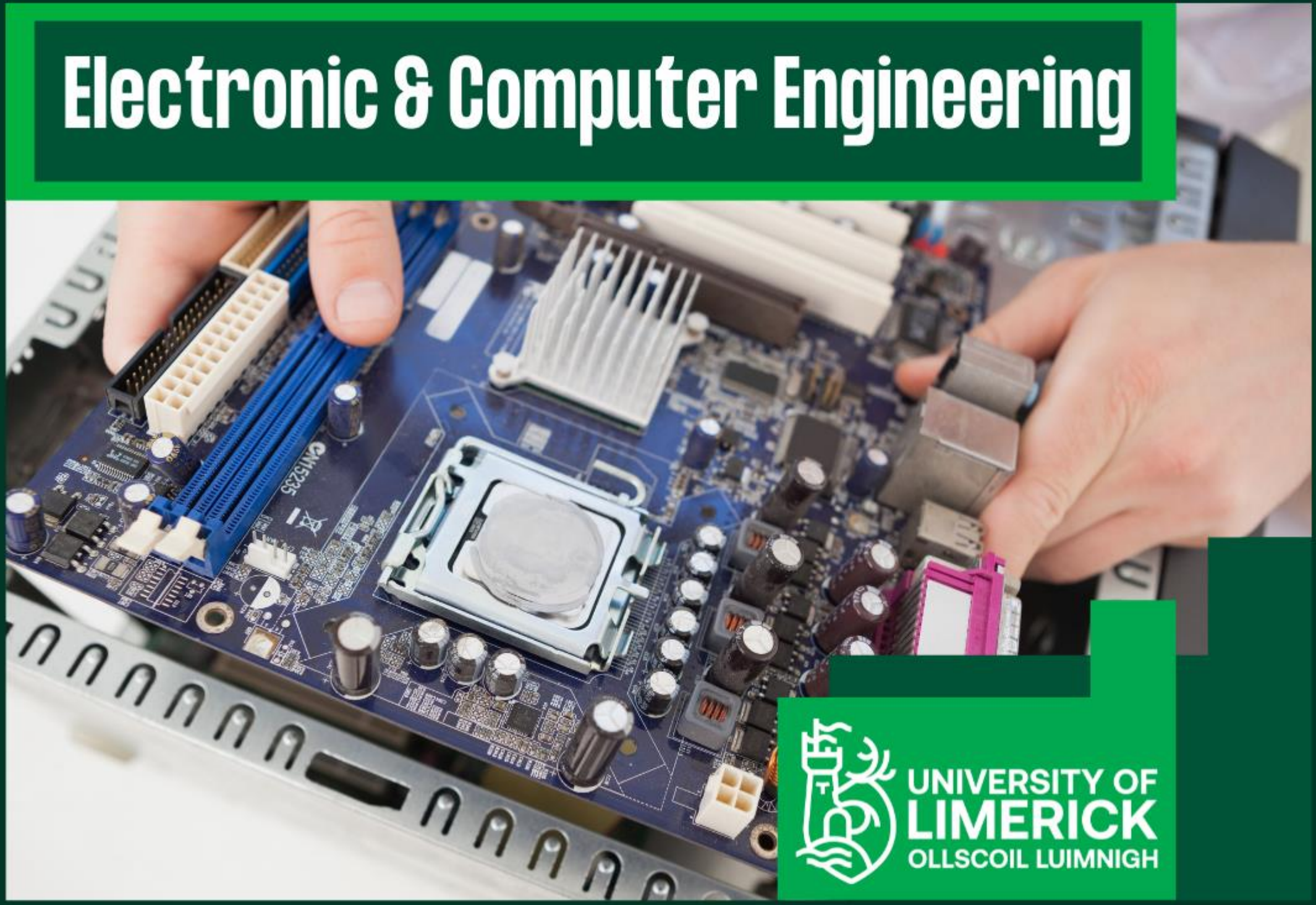
ACADEMIC CONTENT IS NOT CURRENTLY AVAILABLE FOR THIS MODULE - UPDATES ARE IN PROGRESS – Please visit Book of Modules

Computer Science & Information Systems

Rationale and Purpose of the Module:

Syllabus:

Electronic & Computer Engineering



UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Electronic & Computer Engineering Year 1 Modules

CE4701 - COMPUTER SOFTWARE 1
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module:
Introduce students to a high-level object-oriented programming language and its software development environment

Syllabus: The focus of this module is to introduce a modern high level object-oriented programming language to enable the student to develop the programming skills necessary to write simple but useful applications. The following topics will be covered:
Introduction to software development.
Short comparative study of different programming languages. Simple program design techniques e.g. flowcharts. Basic data types, control statements, methods, scope. Relationship between the program, the run time environment and the operating system.
Introduction to programming language documentation.
Introduction to Class Libraries.
Interactive Development Environments. Introduction and demonstration of a low level graphics toolkit.
Basic test practices and test case definition.

EE4001 - ELECTRICAL ENGINEERING 1
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: To give students an understanding of the fundamental concepts of electricity and magnetism.

Syllabus: CONDUCTION: Electric charge and flow. Resistivity, resistance, Ohms Law. Resistors in series and in parallel. Power dissipated in a resistor. Thevenins and Nortons theorem, superposition principle, simple DC circuits. Star- delta transformation.
ELECTROSTATICS: Concepts of electrical charge, electrical fields. Field strength, flux and flux density, Coulombs and Gauss laws. Potential difference, voltage. Capacitance, dielectrics, permittivity. I = Cdv/dt. Parallel plate and coaxial capacitors. Energy stored. Capacitors in series and in parallel.
MAGNETICS: Concept of magnetic field. Magnetic effect of a current, force on a conductor, torque on a current loop. The moving coil meter. Amperes law. Magnetic materials, B, H, and hysteresis. The magnetic circuit.
ELECTROMAGNETIC INDUCTION: Induced emf, Faradays Law of Induction: Lenzs Law. EMF induced in a moving conductor. Electric Generators. Counter EMF, Inductance, v = Ldi/dt. Energy stored in an magnetic field. The LR circuit. AC CIRCUIT ANALYSIS : How the ESB charges for the Energy that it supplies. Efficiency, Simple AC circuit analysis, Basic Filtering, Power Factor, Safety Issues.

EE4011 - ENGINEERING COMPUTING
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module:
Engineering computing is the use of computers, software and numerical methods to solve scientific and engineering problems. The module has two distinct aspects. Firstly, the module aims to introduce students to a number of basic numerical methods commonly used in solving engineering problems and the concepts necessary to implement them in a relevant engineering software package. The second aim is to introduce students to a high level object- oriented programming language and a software development environment.

Syllabus: Brief introduction to computers.
Overview of scalars, vectors & arrays. Overview of logic operands for algorithm development. Introduction to basic numerical methods for solving engineering problems, e.g. search based techniques for finding roots, determining the maxima/minima of mathematical functions and methods for solving sets of simultaneous equations. Algorithm development and implementation of numerical methods in math based software package. Comparative study of different programming languages and software development methods. Introduction to object oriented development. Basic data types, control statements, methods, scope. Introduction to programming language documentation. Introduction to libraries. Interactive Development Environments. Basic test practices and test case definition.

ET4132 - INTRODUCTION TO WEB AND DATABASE TECHNOLOGY
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module will introduce you to the concepts and techniques underlying the World Wide Web, such that you will gain a working knowledge of how to design and build web sites. The module will also present an introduction to relational databases and data models and manipulation.

Syllabus: Overview of the Internet and World Wide Web; standards and specifications Web browsers, Web servers and protocols Designing & creating Web Pages with HTML Web programming: overview of XHTML, XML, CSS and ActiveX controls Multimedia on the WWW including Audio, Video and graphics Data & information: characteristics, differences and structures Data management: simple file storage & retrieval; Introduction to data modelling Introduction to the concept of Database Management System (DBMS) Introduction to Structured Query Language (SQL)

ET4011 - FUNDAMENTALS OF COMPUTER ORGANISATION
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: Students will gain a familiarity with the architecture, design and organisation of modern machines.
Students will become familiar with Boolean algebra and digital logic gates, as the building blocks of a computer.
Students will conduct basic arithmetic with binary and hexadecimal numbers, learn how coding systems allow different representations of data as binary numbers, understand the importance of memory organisation and caching on machine performance and learn how the computer goes about executing programs.

Syllabus: History of computing: topics include Van Neumann's architecture, 0th to 5th generation languages; Data representation and binary arithmetic including floating point representation; Introduction to Boolean algebra and digital logic with topics ranging from truth tables, dualities, and De Morgan's Law, to circuits such as decoders and full adders, flip-flops and registers. Multi-level machine and translation of high-level language programs to the execution stage;
Fetch-Decode-Execute cycle and data path, simple CPU and computer block diagrams, and memory hierarchy
Evolution of computing models such as IoT, cloud, GPUs, multicore, embedded systems etc

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ET4111 - ELECTROTECHNOLOGY ID
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: An introduction to the overall basics of electrotechnology and electrical machines.

Syllabus: Electric charge, movement of charge as a current, conductors and insulators, what makes electrical current flow
potential difference, voltage, resistance to electric current, simple dc circuit analysis, series and parallel connection of components, capacitors and charge storage, charging capacitors magnetic fields generated by electric current, electromagnetics. alternating current (ac), simple ac circuits. magnetism , magnetic flux, electro-magnetic induction. electrical generators, transformers, rectification, direct current (dc) generators, dc motors, induction motors.
electronics, semi-conductor theory, diodes - rectification, transistors - switches/digital, amplifiers/analogue, IC's.

Electronic & Computer Engineering Year 2 Modules

CE4703 - COMPUTER SOFTWARE 3
ECTS Credits: 6 (Year 2 Modules)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the student to algorithms and dynamic data structures (e.g. queue, trees, and dynamic arrays).
Introduce software engineering practices, Flow diagrams and class diagrams. Use good software practice to develop a significant application

Syllabus: The following will be covered:
Algorithms
Growth of functions
Data structures - Linked lists, Stacks, Queues and Red-Black Trees.
Greedy Algorithms * Hash functions and search minimisation techniques * Class/Object unit testing Analysis of algorithms * Case study/Project
Prerequisites: CE4702

EE4003 - THE ENGINEER AS A PROFESSIONAL
ECTS Credits: 6 (Year 2 Modules)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: Communication. Presenting, Writing. Adapting to the Workplace. Effective Meetings, Time Management, Creativity, Stress & Fun, Feedback, Planning, Teamwork, Leadership.
The Engineer as a Professional. Professions &
The Engineering Profession, Professional Bodies, Life Long Learning & Continuous Professional Development Engineering Ethics, Engineers in Society,
Responsibility in Engineering, Common Morality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways

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EE4313 - ACTIVE CIRCUIT DESIGN 1
ECTS Credits: 6 (Year 2 Modules)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module:
Introduction to Active Circuit Design and Analysis.

Syllabus: REVIEW OF BASIC CIRCUITANALYSIS- Basic Circuit Elements, Phasors and Complex Impedance, Circuit Analysis TheoremsAC CIRCUIT ANALYSIS û Combining impedances, frequency response, source conversions, Thevenin and Norton Equivalent Circuits, Mesh and Nodal Analysis, Bridge Networks, D-Y and Y-D conversions.
RESONANCE û Series and Parallel Resonance CircuitsAMPLIFIERS: Properties of an ``ideal'' amplifier. Input and Output impedance. Introduce the Operational Amplifier as an approximation of an ideal amplifier. Simple inverting and non- inverting amplifier circuits.
SMALL-SIGNAL MODELS: Modelling of simple MOS and BJT amplifiers. AMPLIFIER TYPES: Characteristics of common- emitter (common

source), common-base (common gate) and common-collector (common-drain) topologies. Gain characteristics, input, output impedances and key application strengths of each type.
Prerequisites: EE4102

EE4523 - DIGITAL SYSTEMS 2
ECTS Credits: 6 (Year 2 Modules)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: The module covers digital system topics including: Fully synchronous systems; Finite State Machines (FSM); Mealy and Moore type FSMs; Hardware Description Languages and RTL modelling. Modern digital design requires designers to use HDLs for design and verification. (Digital Systems 1 on the programme is a prerequisite for this module.)

Syllabus: Fully synchronous systems: A review of the benefits of a fully synchronous system.
Finite State Machines (FSM): State diagram, state table and assignments. Mealy and Moore type FSMs. Using memory in a general Mealy-Moore state machine. Other approaches: 'One-shot' encoding and shift register-based machines. Hardware Description Languages: The nature and use of HDLs. Hierarchical modelling concepts and structural specification of logic circuits. Gate-level modelling. Behavioural modelling. Description of basic digital circuits using a HDL.
Simulation: Event-driven simulation. Simulation using test benches. Register-Transfer-Level (RTL) description.
Design flow and CAD tools. HDL code for FSMs (E.g. serial multiplier).

ET4003 - ELECTRO TECHNOLOGY (ED)
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides an introduction to electrotechnology for students studying in the area of enterprise engineering, materials and construction. The electronics content of the LM095/LM094 programmes is being expanded to meet the requirements of the impending revised leaving cert. syllabi in Technology and Engineering Technology. Replaces ET4111 Electrotech.. ID

Syllabus: Electrical concepts: electric current, voltage, resistance, power. The relationship between them, units of current, voltage, resistance, power and frequency. The resistor colour code. Measurement of current, voltage, resistance, capacitance, frequency (V, A, W, F, Hz). Indirect measurement of power. The difference between AC and DC. Interpretation of circuit diagrams. Assembly of simple circuits using strip and breadboard. Passive components, resistors, capacitors, inductors, magnetic and electric field effects of charge and current. Diodes. The transistor switch. Voltage regulators, photoresistors, photodiodes, LEDs, phototransistors, variable resistors, potential dividers, potentiometers and relays. Sensors for sound, heat, light (photoresistive and photovoltaic), movement. Electric motors, The mode of operation of the DC motor; back EMF; the variation of current requirement with the load, Reversing a DC motor. Strategies for teaching this subject area at second level. Designing, planning and managing appropriate teaching and learning activities for this subject area.

ET4244 - OUTCOME BASED LEARNING LABORATORY 2
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: In this module students will further develop skills to study, experiment and report on representative electronics based real world systems through interfacing via a PC or over communications networks. The students will apply programming skills, data management skills and theoretical and practical knowledge developed in preceding and concurrent modules in programming, databases and

computer systems. Study will be through a problem-based approach that will integrate material from elsewhere in the programme of study and look forward to future modules.

Syllabus: The module is a follow-on from the Outcome-based Learning Laboratory 1. It will further develop the concepts from the 1st year laboratory modules and will target user-oriented web based design and interactive on-line data acquisition and control, for example, write programs to use the external system to carry out specified task, e.g. temperature control, weather observation, lift control. Design of dynamic web based user oriented systems, top down, bottom up design. * Extraction and display of real world data, data transmission point to point and through networks. * Data exchange in multipoint systems Data manipulation and storage on a PC Interfacing PC to external system directly/over a network.
Control of simple devices via active webpages * Data display in user-friendly format, graphic displays, data on demand. Prerequisites: ET4112

ET4304 - MODERN COMMUNICATIONS: FUNDAMENTALS
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide and introduction to modern communication systems, definitions concepts and communication standards. Both fixed and wireless systems and their fundamentals are discussed. This module introduces the student to modern communications business models and paradigms that are used in the industry today so that the student understands the application areas and differences between the existing models.

Syllabus: History/evolution of communication networks.
Introduction to communications: Definitions and concepts, standards bodies, communications tasks, protocol elements, characteristics and functions; reference communications models (OSI vs. TCP/IP). Physical Layer: Transmission modes and types; analogue vs. digital signals; baseband vs. broadband;
Modulation/demodulation (AM, FM, conceptual introduction to broadband digital modulation); Transmission (sampling, sampling theorem, PCM, baseband digital); Transmission impairments (attenuation, delay distortion, noise);
Channel capacity; data encoding and compression; Physical interfacing; asynchronous vs. synchronous transmission; transmission media (guided, unguided); Structured cabling standards; multiplexing techniques (FDM, TDM, WDM).
Introduction to info theory & channel capacity calculations.
A brief overview of wireless transmission: signals, propagation issues, coding, modulation, multiplexing, spread spectrum.
Overview of communications network evolution: POTS->N-ISDN->B-ISDN and IP-based networks. Modern communications business models and paradigms: Subscriber-centric model; consumer-centric model; integrated heterogeneous networking, infrastructural elements.

Electronic & Computer Engineering Year 3 Modules

CE4706 - SOFTWARE ENGINEERING 1
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the domain of software engineering from a programmer's perspective focusing on object oriented analysis, design and programming. To revisit and develop existing computer software skills

and competence. - To emphasise good Software Engineering Practices
To enhance individual and team working skills

Syllabus: Introduction to Software Engineering. Software Development Paradigms. Software Evolution and Reliability. Human Factors in Software Engineering. Software Specification, System Modelling. Requirements Definition/Specification. Software Design: Modularity, Cohesion, Coupling. Function Oriented Design. Diagramming Techniques. Structured Design. Software Reviewing and Testing. Software Quality Assurance and metrics. More ADTs and algorithms. Introduction to Object Oriented Analysis/Design and Programming
Languages Programming Practice: Coding, Style, Documentation The C++ Programming Language (continued):C++ versus C, Objects and Classes, Function and Operator Overloading, Inheritance and Polymorphism, Input and Output, Memory Management, Templates. Development Environments: Debuggers, Profilers, Browsers. Individual and Team Project/Case Study.
Prerequisites: CE4704

ET4435 - COMPUTER NETWORKS, STANDARDS, PROTOCOLS & THE IOT
ECTS Credits: 6 (Year 3 Module)
Limited Spaces Available: 5
(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide further education in communications networks and provides a detailed overview of the main international networking standards. The module also introduces students to modern communications standardised infrastructures and the Internet of Things (IoT). The module offers the student a learn-by-doing approach in communications and computer networks, for a better understanding of how networking technologies, mainly network protocols, operate in practice.

Syllabus: Introduction to layered architectures, basic concepts: open systems, layering, peer protocols, primitives and services. Reference models: telecommunications vs. computing approaches, OSI vs. TCP/IP, layers functions, IoT and Wireless Sensor Networks (WSNs) Layer 2 LAN protocols: Ethernet, token ring and FDDI: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames. Network management: SNMP case study. Network security: Using routers as firewalls. Personal Area Networks (PANs): Bluetooth, IEEE 802.15 standard. Local Area Networks (LANs): Medium Access Control (CSMA/CD vs. CSMA/CA); logical link control (LLC), IEEE standards: 802.3/u/z/ae (ethernet), 802.11 (WiFi), 802.1Q (VLAN). Metropolitan Area Networks (MANs): IEEE 802.16 (WiMax) standard. Wide Area Networks (WANs): Multi-Protocol Label Switching (MPLS); WAN protocols: HDLC, frame relay, PPP; ATM: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames. Internet of Things (IoT): MQTT, 6LowPAN, IPv6 Broadcast audio/video carrier technologies: Terrestrial (DAM, DRM, DVB-T/DVB-H, MBMS), satellite (DVB, S-DMB, Digital Audio Radio Satellite).

Electronic & Computer Engineering Year 4 Modules

CE4317 - INTRODUCTION TO DATA ENGINEERING AND MACHINE LEARNING
ECTS Credits: 6 (Year 4 Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: To give students an insight and grounding into information/data engineering and machine learning. This module is for undergraduates (A module with the same overall title but with more mathematical content is available at level 9 for blended learning/online delivery). The module will cover

mathematical and coding skills essential to developing machine learning applications in Python and will provide an introduction to some advanced machine learning topics such as modern machine learning platforms, data visualisation and deep learning.

Syllabus: 1. Programming language (e.g. Python) for machine learning 2. Numeric support in typical scientific scripting (e.g., Numpy/Scipy). 3. Graphics and Scientific Visualization: Using scripting languages to build scientific visualizations. 4. Basic concepts of machine learning. 5. Programming basics for machine learning. 6. Introduction to machine learning frameworks (e.g. Scikitlearn, TensorFlow, PyTorch, Caffe2, CNTK etc.)

ET4407 - ELECTRONICS AND THE ENVIRONMENT

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: The protection of the environment in conjunction with economic growth will become one of the great challenges of the 21st century for a multitude of reasons. If the electronics industry is to sustain its growth levels of the last number of decades going forward this challenge will become foremost in the job function of its employees. This module will introduce the concepts which underpin this challenge. It seeks to inform students of the necessity of environmental awareness in the electronics industry and to introduce the means by which these environmental issues can be addressed.

Syllabus: 1. Environmental Forces in the Electronics Industry: Market Driven, Sustainability Driven, Legislation Driven.
Design for Environment (ECO Design): Life cycle chain analysis, design for recycling, reverse manufacturing, reverse logistics, end of life solutions. Green materials: lead free interconnects, halogen free materials, all other materials outlined in WEEE and ROHS, packaging.
Sustainability, energy efficiency, alternative power supply. Case studies discussing such issues as environmental challenges in the semiconductor industry, producer responsibility in the electronics industry and sustainable trade in the electronics sector of emerging economies among other topics. Invited talks: Seminars by the local electronics industry on environmental challenges in their company.

CE4607 - COMPUTER NETWORKS 1

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides a unified view of the field of computer communications and networks. The module seeks to integrate a number of topics introduced in earlier parts of the course and addresses the analysis, design and performance evaluation of data communication systems. The module covers communications within and between computer systems, and communications protocols and standards.

Syllabus: * [Introduction to Data and Computer Communications] Communications tasks; Protocol elements, characteristics, and functions; Protocol architectures; Reference communications models overview: OSI vs. TCP/IP (layersÆ description and functions, PDU encapsulation). * [Physical Transmission] Transmission modes (simplex, half duplex, full duplex) and transmission types (baseband, broadband); Analogue and digital signals; Transmission impairments (attenuation, delay distortion, noise); Channel capacity; Data encoding and modulation; Physical interfacing; Asynchronous & synchronous transmission; Transmission media; Multiplexing techniques (FDM, TDM, WDM). * [Link-by-Link Communication] Line disciplines (ENQ/ACK, poll/select); Framing; Frame synchronization & data transparency, Flow control; Error control; Addressing; Link management; Protocol examples (character-oriented, byte-count, bit-oriented). * [Network Services] Switching

(circuit-, message-, packet switching); Addressing (classful vs. classless IP addressing); NAT operation (static and dynamic); IP subnetting and supernetting; Routing (concepts and principles; routing algorithms û flooding, static, dynamic; central and distributed control; distance vector vs. link state routing; hierarchical routing; routing protocols examples: interior vs. exterior); Congestion control; QoS provision; IP protocol: main functions and operation (IPv4 vs. IPv6); Mobile IP; Address resolution with ARP and RARP; Internet multicasting (MBone operation) and group management (IGMP protocol); Control and assistance mechanisms (ICMP protocol: v4 vs. v6). Modular design of protocols. * [Transport Services] Overview (connection-oriented vs. connectionless; segmentation and re-assembly; end-to-end delivery, flow control & buffering; crash recovery); Unreliable datagram transport with UDP; Real-time transport with RTP and RTCP; Reliable connection-oriented transport with TCP and SCTP; Wireless TCP; Modular design of protocols. * [End-to-End Communication] Session management (SIP and SDP protocols); Data presentation (ASN.1 and NVT); Client-server communication model; Domain Name System (DNS); TCP/IP configuration: static (BOOTP protocol) vs. dynamic (DHCP protocol); Terminal networking with Telnet; File transfer with FTP and TFTP; E-mail service (SMTP, POP, IMAP protocols); Browsing with HTTP; Network management with SNMP. * [Practical Implementation] Building and testing different types of patch cables; Serial interface configuration; Device configuration: IOS software, managing configuration files, updating software; Router configuration: initialisation, commands and modes of operation; Routing protocolsÆ configuration, operation and evaluation: RIP, IGRP etc.; Network configuration: testing established connectivity and routes. Analysing and interpreting IP addresses and subnets; Scaling the IP address space: CIDR, private addressing, secondary IP addressing, MTU and fragmentation; NAT configuration; TCP/IP protocols configuration and operation.

Prerequisites: EE4616

CE4817 - DIGITAL SIGNAL PROCESSING 1

ECTS Credits: 6 (Year 4 Module)

Limited Spaces Available: 5

(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides practical coverage of the fundamentals of digital signal processing, with emphasis on the following key topics: the discrete Fourier transform, the z-transform and digital filter design.

Syllabus: TRANSFORMS: Review of the Fourier transform, its properties and the more general Laplace transform. Sampling and Railings leading to the z-transform for discrete signals. The DFT and its relationship to these transforms. SYSTEMS: Difference equations and the z-transform. Recursive and non-recursive systems and their z-plane descriptions. Examples: averaging filter, integrator, differentiator. Important properties; linear phase systems, all pass systems. SIGNAL WINDOWING: Choice of windows for reduced spectral leakage. The DFT as a signal analyser. Windowing in the DFT context. Padding with zeros to reduce picket-fence effect. NON-RECURSIVE FILTERS: Design by windowing methods. Sample design. RECURSIVE FILTERS: Design based on analogue prototypes. Bi-linear mapping approach and Impulse-invariant approach, their areas of suitability. Case studies. FILTER TRANSFORMATION: Transformations for BP and HP filters. Analogue and digital approaches. NOISE: Overview of noise issues and the correlation method. RATE CONVERSION: Introduction to up-sampling and down-sampling.SIGMA-DELTA methods in A/D and D/A conversion.

Prerequisites: EE4816

ET4031 - ELECTRICAL AUTOMATION

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides the necessary understanding, knowledge and skills for students to design

automated systems for industrial / manufacturing/process, built environment and other domains. This module replaces ET4087 Electrical Automation and updates the content of this module/subject. The purpose of the module is to equip Electronic and computer engineering students with the necessary skills to design, build and install automated systems in the built environment, in industry and elsewhere. The module thus provides students with electronics design and computer programming background with application domain expertise for automation in manufacturing, industry, process and built environment. This module will be offered to the Master of Engineering in Electronic and Computer Engineering programme using module ID 3297 Electrical Automation

Syllabus: [Motion Control] Open Loop and servos/closed loop electric motors, drives and controllers, steppers, DC servos, brushless motors. motion sensors/transducers for servo operation, tachometers, optical encoders, resolvers. [Pneumatics] Electro pneumatics, valves, pneumatic devices, pneumatic control systems. [Programmable Logic Controllers PLCs], PLC programming and installation. [Mechanical System Components] and considerations friction, low friction designs, inertia matching, gear-boxes, screws, worms, toothed belts, harmonic drives. Choice of motor system to match speed, accuracy, stiffness, efficiency requirements etc. [Industrial Robots] Classification; robot programming. [Building Automation] Use of programmable logic devices for home/building automation and security applications in modern buildings. [Laboratory Work] Problem based laboratories will use a combination of Automation Rigs Labview and PLC exercises.
Prerequisites: ET4224

ET4021 - ELECTRONICS LIFE CYCLE ENGINEERING
ECTS Credits: 6 (Year 4 Module)
Limited Spaces Available: 5
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: The electronics sector is facing a range of sustainability mega-trends related to critical raw materials, energy, climate change and waste. This module will explore the implications of these pressures on the sector and introduce solutions to mitigate the impacts. This module (code 3280) is to be added to the Master of Engineering in Electronic & Computer Engineering

Syllabus: 1. Sustainability Forces in the Electronics Sector: Critical Raw Materials, Energy and Water in Manufacturing, Energy in the Use Phase, Climate Change and Carbon taxation, WEEE & Extended Producer Responsibility, E-Waste in Developing Countries 2. Sustainability Solutions in the Electronics Sector: Circular Economy & Product Service Systems, Materials Substitution & Thrifting, Renewable Energy & Smart Grids, Cloud Computing, Design for Remanufacturing/Reuse/Recycling, IoT and Life Consumption Monitoring, Extended Producer Responsibility in Developing Countries 3. Streamlined Life Cycle Assessment and its implementation in the life cycle of electronic products/services

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ET4047 - EMBEDDED SOFTWARE
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of the module is to provide an introduction to embedded processor systems and applications. The main objectives are to provide the student with an overview of the architecture of a simple microprocessor, to explain the operating principles and provide a functional understanding of assembly language.

Syllabus: Introduce a simple microprocessor architecture - Registers, buses and memory organisation and how it is used in embedded applications. Describe memory and I/O devices. Explain memory and I/O accesses. Introduce instruction sets, addressing modes, data move instructions, arithmetic instruction, stack operation

and usage, program flow control instructions, sub routines and loops. Detail assembler directives and the program translation process. Review the build and load process for embedded application programs. Introduce simulation tools and debugging techniques Introduce the monitor program and how to use it to test applications using target hardware. Describe how to control/communicate with I/O devices through polling and interrupts. Interrupt service routines, interrupt priority, multiple interrupts, nesting. Use practical programming examples to illustrate concepts.

ET4307 - APPLIED CLOUD COMPUTING

ECTS Credits: 6 (Year 4 Module)

(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module This module will give the student experience in the practice of Cloud Computing including aspects of cloud architecting and design, with developing in the cloud and/or operations in the cloud. In addition managing and securing services in the cloud will be discussed as will Cloud Computing Security Issues and resolutions related to security management and Access control issues.

Syllabus: Architecting in Cloud Environments: Design Principles, Networking, Design for High Availability, Automating, Decoupling. Cloud Computing Technology Foundations: Compute, Storage, Networking, tools for key cloud features, e.g. scaling, monitoring. Decoupled and serverless computing in the cloud. Managing and securing services in the cloud. Cloud Computing Security Issues: Security Principles applied to Cloud Environment, Security management and Access control issues.

ET4437 - DISTRIBUTED COMPUTING AND JAVA

ECTS Credits: 6 (Year 4 Module)

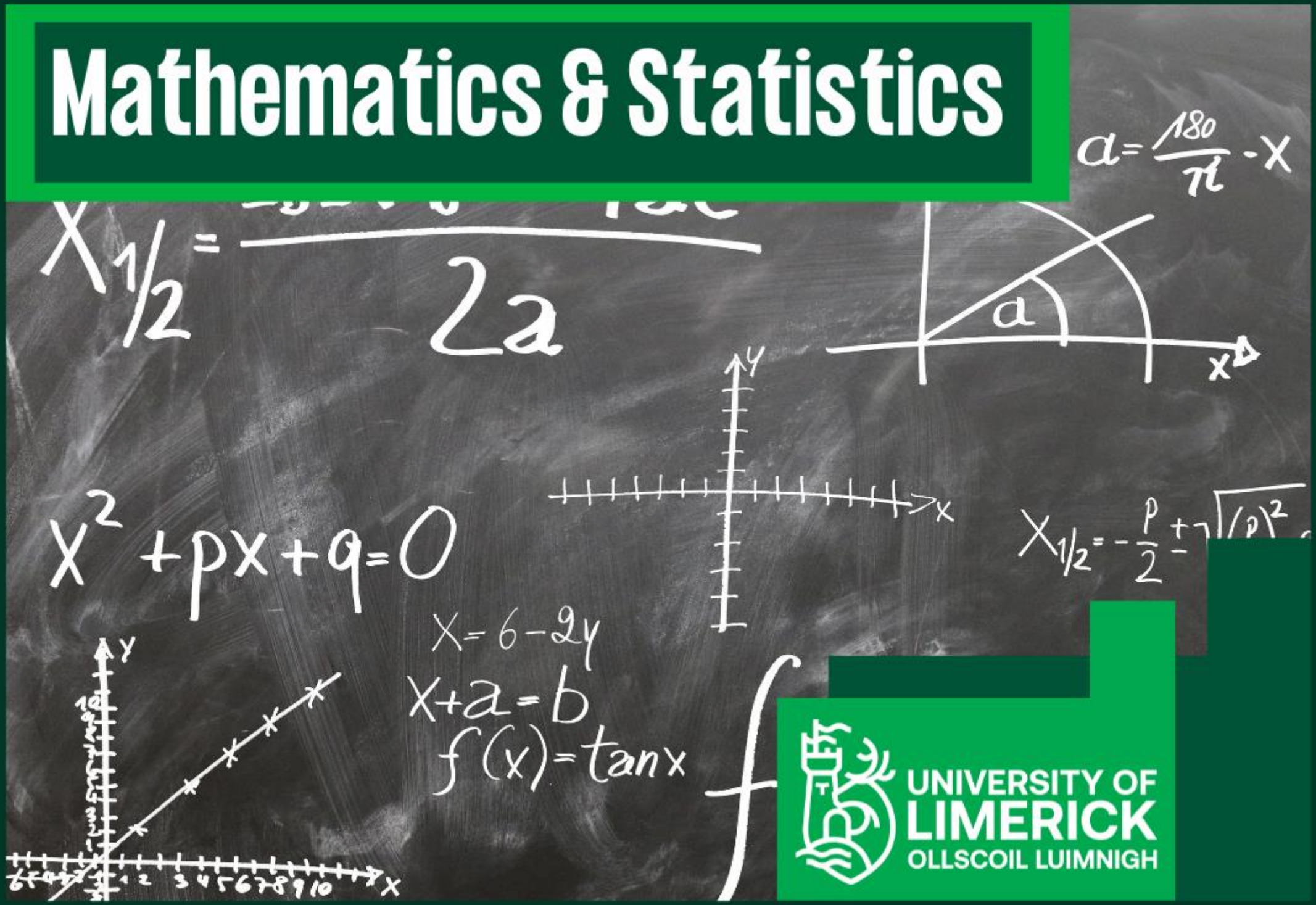
(Lab-Based Module)

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the student to Java and Distributed Computing including Remote Method Invocation and JavaBeans. To examine the role of Java in Distributed Systems and Web based Services including Security issues. In addition XML and advanced GUI features will be investigated. On completion of this module the student should have an appreciation of the issues pertaining to the use of Java in a large Distributed Enterprise Environment.

Syllabus: JavaBeans Component Model, Creating a JavaBean. Security - Digital Signatures, Java Keystores, Java Authentication and Authorization Service. Java-based Wireless Applications and J2ME. Remote Method Invocation. Enterprise JavaBeans and Distributed Transactions. Messaging with the Java Messaging Service (JMS). Jini - plug and play interfaces, discovery services. JavaSpaces - Communicating and sharing information in asynchronous environments Peer-to-Peer Applications. Case Study. Extenible Mark-up Language (XML) and Simple Object Access Protocol (SOAP). Major programming project.

Mathematics & Statistics



UNIVERSITY OF LIMERICK
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Mathematics & Statistics

Year 1 Modules

MA4001 - ENGINEERING MATHEMATICS 1
ECTS Credits: 6 (Year 1 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To develop the student's understanding of and problem-solving skills in the areas of Pre-Calculus and Differential Calculus.

Syllabus: [Series] and tests for convergence. Real valued [functions] of a real variable, [limits, continuity and differentiation from first principles]. Physical and graphical interpretation of derivatives. [Transcendental functions]: properties of trignometric, exponential, logarithmic and hyperbolic functions and their inverses. [Vector Algebra]: coordinates, resolution of vectors, dot product and cross product. [Complex numbers]: Cartesian, polar and exponential forms. The algebra of complex numbers. The nth roots of unity. [Differential Calculus: properties] of derivatives, product, quotient and chain rules. Derivatives of transcendental functions.
Applications of Differential Calculus to finding [maxima and minima, curve sketching, roots of equations] (Newton's method), [undetermined forms] (L'Hopital's Rule) and [Power Series] (Taylor and Maclaurin Series) of a univariate function.

MA4601 - SCIENCE MATHEMATICS 1
ECTS Credits: 6 (Year 1 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: * To introduce students to the fundamental concepts of calculus and linear algebra. * To develop and integrate the basic mathematical skills relevant to science.

Syllabus: [Vectors:] definition; addition; components, resultant, position vector; scalar product; dot product and angle between vectors; cross product; simple applications in mechanics. [Trigonometry:] basic definitions and relation to unit circle; basic formulae and identities; frequency, amplitude, and phase. [Linear equations:] solution of systems of linear equations by Gaussian elimination. examples with a unique solution, an infinite number, or no solutions. [Matrices:] Addition and multiplication; matrix inversion; simple determinants. [Functions:] graphs and functions; polynomial and algebraic functions; curve-fitting. least-squares approximation (formula only); exponential and logarithm; inverse function. [Derivative and applications:] basic concepts: slope as rate of change. differentiation of sum, product, quotient; chain rule; derivative of standard functions. tangent and normal; higher derivatives; maxima and minima; applications to optimisation in science.

MA4701 - TECHNOLOGICAL MATHEMATICS 1
ECTS Credits: 6 (Year 1 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To introduce students to the fundamental concepts of calculus and linear algebra.
To develop and integrate the basic mathematical skills relevant to technology.

Syllabus: Functions: graphs and functions, linear, quadratic and polynomial functions, exponential and logarithm, inverse function, limits and continuity; Trigonometry:basic ideas, definitions, formulae and identities, sine and cosine rules, applications, circular functions; the Derivative and its applications: basic concept, rate of change, differentiation of sum product, quotient, chain rule, derivative of standard functions, simple applications, tangent and normal; Experimental Laws:curve-fitting, graphical techniques, expressions reducible to linear form, least-square approximation (formula only); Linear equations:solution of systems of linear equations by

Gaussian elimination, examples with a unique solution, an infinite number or no solutions;Vectors:definition, addition, components, resultant, position vector, scalar product, dot product and angle between vectors. Complex Numbers:necessity, examples, definition, properties, equality, conjugate, modulus, geometric representations, Argand diagram, polar form: argument, exponential form, de Moivres theorem, powers and roots.

MS4021 - CALCULUS 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module: This module introduces differential calculus and analysis. It develops problem solving skills and introduces concepts such as definition, lemma, theorem, proof and different methods of proof, including direct, contrapositive and induction.

Syllabus: • Basic properties of the real numbers: Important subsets (natural, integers, rationals), open and closed intervals, neighbourhoods, supremum, infinimum, boundedness, compactness.
• Algebra of Complex numbers: modulus, phase, Argand diagrams, de Moivre's theorem and roots of complex numbers. • Real valued functions: Definition of function, properties of functions: one-to-one, onto, inverse function, composition of functions, parametric functions. • Limits and continuity: Definition of limit, limit theorems, limit points, definition and meaning of continuity, examples of discontinuous functions (e.g. Heaviside step function), Squeezing Theorem, Intermediate Value Theorem, Bisection Method. • The derivative and differentiation techniques: Differentiation from first principles, derivative of sums, products, quotients, inverse of a function, chain rule, smoothness of a function, Rolle's theorem, Mean Value Theorem. • Properties of transcendental functions: Including trigonometric, exponential logarithmic and hyperbolic functions; derivatives and inverse functions. • Applications of differentiation: Finding roots of equations (Newton's method), Indeterminate forms (L'Hopital's rule); implicit differentiation; optimisation applications, the Second Derivative Test. • Curve sketching: Domain and range, roots of equations, increasing and decreasing, maxima and minima, concavity, points of inflection, symmetry, asymptotes.

MS4101 - MATHEMATICAL LABORATORY

ECTS Credits: 6 (Year 1 Module)

(Lab-Based Module)

Limited places available: 3

Mathematics & Statistics

Rational and Purpose of the Module: To introduce students to a symbolic algebra package (Maple) as a mathematical problem-solving tool.

Syllabus: [Using a symbolic algebra package (MAPLE) for the analysis and solution of simple mathematical models.] Systematic approach to scientific problem-solving.
Extensive use will be made of case studies and assessment will be largely project based.

MS4111 - DISCRETE MATHEMATICS 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module: The aim of this module is to introduce students to some of the language of Discrete Mathematics, and to show its relevance, particularly in the context of Computer Science. It is taught at a level that is appropriate to first year students, i.e. without an excess of formality. The module should re-inforce the development of the students "thinking" skills, and should enable them to undertake further study in the various applied areas of Discrete Mathematics (coding, graphs, logic and formal systems etc)

Syllabus: Review of sets and operations on sets, power sets. Propositional logic, truth tables, propositional calculus, equivalence. Predicate logic, quantifiers, equivalence, application to (mathematical) proof.
Cartesian product of sets, relations, equivalence relations, matrix representation of relations, composition of relations, functions, types of functions. Number systems, natural numbers, integers,
rationals, reals, axioms for N, proof by induction, recursive definitions and algorithms, recurrence relations. Representations of N (binary, octal, etc), other number "fields". Introductory combinatorics, permutations, combinations.

MS4131 - LINEAR ALGEBRA 1

ECTS Credits: 6 (Year 1 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module: The aim of this module is to introduce students to the main ideas of Linear Algebra and its many applications. The emphasis is on developing the student's ability to perform calculations on and with matrices, particularly 2x2 and 3x3 matrices, and on and with vectors in 2 and 3 dimensions. These ideas are then extended to higher dimensions.

Syllabus: Matrices: introduction to matrices, matrix algebra, transpose of a matrix, symmetric matrices, invertible matrices and their inverses, determinants. Vectors in 2 and 3 dimensions: geometric interpretation of vectors, vector arithmetic, Euclidean norm, Euclidean scalar product, angle, orthogonality, projections,
cross product and its uses in the study of lines and planes in 3 dimensions.
Lines and planes in 3-dimensional space: parametric equation of a line, distance between a point and a line, point-normal form and general form of the equation of a plane, distance between a point and a plane.
Extension to vectors in n dimensions;
Systems of linear equations and their solution: Gaussian elimination methods
(Gauss, Gauss-Jordan) and inverse matrix method;
Matrices acting on vectors: eigenvalues and eigenvectors particularly in 2 and 3 dimensions.
Applications: least squares fit, rotation matrices.

Mathematics & Statistics Year 2 Modules

MA4003 - ENGINEERING MATHEMATICS 3

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the student to the Laplace Transform, Fourier Series, and their use in solving Ordinary Differential Equations. To introduce the student to the theory and methods of Linear Algebra. To give the student a broad understanding of the numerical processes used in solving Linear Algebra problems, and their extension to some nonlinear problems

Syllabus: Laplace Transforms, Transform
Theorems, Convolution, the Inverse Transform. Fourier Series functions of arbitrary period, even and odd functions, half-range expansions. Application of Laplace transforms and Fourier series to finding solutions of ordinary differential equations. Vector Spaces, linear independence, spanning, bases, row and column spaces, rank.
Inner Products, norms, orthogonality. Projection theorems and applications, e.g. least squares, and fitting data with orthogonal polynomials. Eigenvalues and eigenvectors. Diagonalisability. Symmetric matrices, including numerical methods to diagonalise same. Numerical solution of systems of linear equations : Gauss elimination, LU-decomposition, Cholesky decomposition, pivoting, iterative improvement, condition number; iterative methods including Jacobi, Gauss-Seidel and S.O.R.
Prerequisites: MA4002

MA4005 - ENGINEERING MATHEMATICS T1

ECTS Credits: 6 (Year 2 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To review and reinforce the student's understanding of and problem solving skills in the areas of * Multivariate and Integral Calculus and Differential Equations. * The Laplace Transform and Fourier Series and their use in solving Ordinary Differential equations. * Matrix Algebra and its application to solving systems of linear equations. Basic Linear Algebra. The numerical processes used in solving Linear Algebra problems, and their extension to some nonlinear problems.

Syllabus: Functions of several variables and partial differentiation . The Indefinite Integral : Integration techniques including integration of standard functions, substitution, by parts and using partial fractions. The Definite Integral. Application of integration to finding areas, lengths, surface areas, volumes and moments of inertia. Numerical Integration : Trapezoidal rule, Simpson's Rule. Ordinary Differential Equations : first order including variables separable and linear types. Linear second order equations with constant coefficients. Numerical solution by Runge-Kutta. The Laplace Transform : Tables, theorems. Application of the method to the solution of linear ordinary differential equations. Fourier Series functions of arbitrary period, even and odd functions, half-range expansions. Application of Laplace transforms and Fourier series to finding solutions of ordinary differential equations. Matrix representation of and solution of systems of linear equations. Matrix algebra, invertibility, determinants. Vector Spaces linear independence, spanning, bases, row and column spaces, rank. Inner Products, norms, orthogonality. Eigenvalues and eigenvectors. Numerical solution of systems of linear equations : Gauss elimination, LU-decomposition. Cholesky decomposition; iterative methods Extension to nonlinear systems using Newton's method

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MA4113 - APPLIED BUSINESS MATHEMATICS
ECTS Credits: 6 (Year 2 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: This module contains the first half of MA4102 and of MA4103. Purpose: To introduce mathematical concepts and techniques, with applications in economics, finance and in business in general. To develop an appropriate foundation in mathematics for students from diverse mathematical backgrounds.

Syllabus: Review of algebra: fractions and rational expressions, linear equations and inequalities. Economic models: cost and revenue, supply and demand curves. Simultaneous linear and quadratic equations (solved algebraically and graphically); applications to market equilibrium and break-even analysis.
Linear programming: plotting linear inequalities in two variables, feasible region, constrained optimisation; solving linear optimisation problems using the graphical method; applications to maximising profit/revenue, minimising cost etc. Mathematics of finance: geometric sequences and series; applications to compound interest, present value, valuation of annuities and mortgages. Matrices: definitions, matrix algebra: addition, subtraction, scalar multiplication, matrix product; determinants (2X2); matrix inversion; representing and solving linear systems using matrices. Functions and their graphs: definition of a function (including function of several variables), combining functions, inverse functions; graphs of linear, quadratic, cubic polynomials; roots and factors; negative powers and rational powers.
Exponents and logarithmic functions: laws of exponents (indices) and logarithms; the number e; the exponential function and natural log function; graphs of exponential and natural log; applications to population growth and depreciation of capital.
Differential calculus: concept of continuity; small change, secant line, slope, tangent line, definition of derivative; differentiation from first principles (quadratics only); derivative as instantaneous rate of change: application to marginal cost and marginal

revenue; power rule, derivative of negative powers, fractional powers, exponentials and logs; higher derivatives; the Product, Quotient and Chain Rules. Curve sketching using calculus and business applications: increasing and decreasing functions, turning points: local maxima and minima, the Second Derivative Test, concavity, points of inflection.

MS4403 - ORDINARY DIFFERENTIAL EQUATIONS

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module:

To introduce and consolidate the concepts and techniques necessary for solving ordinary differential equations(including non-linear ordinary differential equations and phase plane techniques).

Syllabus: Classification, initial and boundary value problems. Review of first order equations: separable equations, linear and nonlinear equations, integrating factors, exact equations, homogeneous equations; existence and uniqueness; applications e.g., in mechanics, population dynamics. Second order linear equations, homogeneous with constant coefficients, linear independence and Wronskian, inhomogeneous equations, variation of parameters, applications in oscillators, higher order linear equations, systems of equations. Series solution of second order linear equations, regular and singular points, BesselÆs equation. Sturm-Liouville theory Nonlinear ODEs: ad-hoc solution techniques, introduction to the concepts of stability and phase plane techniques.

Prerequisite: MS4022

MA4603 - SCIENCE MATHEMATICS 3

ECTS Credits: 6 (Year 2 Module)

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce students to the fundamental ideas of uncertainty through probability. To introduce students to the most widely used statistical distributions and applications thereof. To lay a good foundation for the stream of statistically oriented modules in the fourth year. To introduce statistical inference through the concepts of estimation and hypothesis testing. To introduce students to a modern statistical software package (e.g. MINITAB), and motivate the practice of statistics through the analysis of real data and case studies.

Syllabus: Variables: continuous and discrete; Representation of variables: frequency tables, histograms, bar charts, etc; Reduction of variables: measures of location and dispersion, mean, variance, range, median, quartiles, etc; Introduction to the fundamentals of probability; Experiments, sample spaces, events; Laws of probability: addition and multiplication, conditional probability (sensitivity and specificity); Introduction to random variables; probability density functions; Special distributions:binomial, normal; Statistical inference: point and interval estimates, standard error of an estimator, hypothesis testing, one and two-tailed tests; One and two sample problems for the mean, variance and proportion; Relationships between quantitative variables:PearsonÆs correlation coefficient; Regression analysis.

Prerequisite: MA4601, MA4602

MS4035 - PROBABILITY MODELS

ECTS Credits: 6 (Year 2 Module)

Limited places available: 3

Mathematics & Statistics

Rationale and Purpose of the Module: This module replaces module MS4213 Probability Theory. It is being created as part of major changes to LM058/LM060, brought about in part by Project Maths. The new first year module MS4222 now contains some probability and this module builds on and extends that knowledge. The intention in this module is to firmly establish the connections between probability theory and its role in statistical applications.

Syllabus: Continuous Random Variables: expectation and variance; uniform, normal, exponential, gamma, beta, Cauchy, Weibull, distribution of a function of a random variable. Jointly Distributed Random Variables: joint distribution functions, sums of independent random variables, conditional densities, functions of jointly distributed random variables, (sum, difference, product, and quotient of two random variables).
Properties of Expectation: computing probabilities and expectations by conditioning, conditional variance, conditional expectation and prediction.
Sampling Distributions: the central limit theorem, the t-, chi-squared and F distributions and their use as sampling distributions; joint distribution of order statistics, distribution of sample range. Estimation: method-of-moments, fitting standard distributions to discrete and continuous data, pivotal quantities, confidence intervals.
Simulation: Monte Carlo methods, variance reduction techniques, applications of simulation.
Prerequisites: MS4222

MS4043 - METHODS OF LINEAR ANALYSIS
ECTS Credits: 6 (Year 2 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the students to the concepts of series of orthogonal functions, linear operators, and integral transformations.

Syllabus: Introduction to Hilbert spaces, orthogonal sets of functions, Fourier series, linear operators (adjoint operators and adjoint spaces, self-adjoint and unitary operators), and Fourier and Laplace transformations.

MS4613 - VECTOR ANALYSIS
ECTS Credits: 6 (Year 2 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: * To review the basic tools of linear algebra. * To introduce the student to the laws of physics in vector form. To give the student a solid grounding in vector analysis.

Syllabus: [Vectorial Mechanics:] rotation of axes, index notation, review of vector and scalar algebra (scalar vector and triple scalar products); vector functions of a real variable, functions of time; differentiation of vectors, derivative of dot and cross products, tangent to a curve, arclength, smoothness, curvature, applications in mechanics. [Fields:] scalar and vector fields; functions of several variables, maxima/minima,contour maps, directional derivative and gradient vector of scalar fields; divergence and curl of vector field; applications in electromagnetism and fluid mechanics; vector identities; cylindrical and spherical coordinates. [Line, surface and volume integrals] line integrals and work; conservation of energy and potential function; applications to planetary dynamics, area, surface and volume integrals; Gauss's GreenÆs and Stoke's theorems. Multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, HelmholtzÆs theorem. [Tensor Algebra and Calculus:] Review of matrix algebra introducing suffix notation; definition of determinant; evaluation of determinants by row and column expansions; eigenvalues and eigenvectors, introduction to Cartesian tensors.
Prerequisites: MS4602, MS4022

Mathematics & Statistics Year 3 Modules

MA4605 - CHEMOMETRICS
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To give students a clear understanding of the importance of statistical methods in their work. To introduce

students to the most widely used statistical techniques in the chemical process industries. To develop skills in the use of these techniques through actual case studies using statistical software packages

Syllabus: Hypothesis testing - type I and type II error, one and two-tailed tests, oc curves. Statistical process control - various charts, mean/range, individuals/moving range, cusum charts. Capability studies - capability indices.
Correlation and Regression - method of least squares, multiple regression, linear and non-linear models, regression analysis, analysis of residuals.
Importance of plotting data. Design of experiments and analysis of variance - one and two way ANOVA, interaction, factorial designs, responses and factors, Plackett-Burman design, response surface methodology.
Prerequisites: MA4603

MB4005 - ANALYSIS
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To develop an understanding of formal methods of mathematical analysis, as applied to sets, real numbers, and general topology.

Syllabus: • Set theory: equivalence classes of sets, cardinal numbers, countability and uncountability, including the uncountability of R. • Functions of a real variable: limits, continuity and differentiability from first principles. • Multivariate functions: inverse function theorem, implicit function theorem. • Complex functions: differentiability and Cauchy-Riemann equations. • The completeness property: Bolzano-Weierstrass theorem, Cauchy sequences and completeness. • Sequences and series of functions: pointwise and uniform convergence, term-by-term differentiation and integration. • General topology: Euclidean n-space, metric spaces, connectedness, compactness, fixed point theorem, Hilbert spaces.
Prerequisites: MS4021 , MS4022

MS4008 - MATHEMATICAL METHODS 2: Numerical Methods for Partial Differential Equations
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: Having completed this module, the students should understand and be able to apply the standard finite difference methods for the numerical solution of two-dimensional linear partial differential equations; they should also understand how the finite element method is used to solve similar problems.

Syllabus: Finite difference methods: Elliptic problems: stability, consistency and convergence; parabolic problems; explicit and implicit methods, Von Neumann stability analysis; hyperbolic problems; method of characteristics.
Finite element method: Introduction to FEM for elliptic problems: analysis of Galerkin FEM for a model self-adjoin two point boundary value problem, weak solutions, linear basis functions, matrix assembly; extension of method to two dimensions, triangular and quadrilateral elements.
Prerequisites: MS4404

MS4045 - COMPLEX ANALYSIS
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the concept of an analytic function of a complex variable and integration on the complex plane.

Syllabus: Single- and multi-valued functions, branch points and branch cuts; analytic functions, the Cauchy-Riemann equations; Laurent series,

poles and essential singularities; Cauchy's Integral Theorem, Cauchy's Integral Formula; the Residue Theorem, the Estimation Lemma, Jordan's Lemma, integration of functions with branch points; conformal mappings; analytic continuation.
Prerequisites: MS4022

MS4105 - LINEAR ALGEBRA 2
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: The aim of this module is to introduce some more advanced concepts in Linear Algebra and Numerical Linear Algebra

Syllabus: Complex vector Spaces: Review of real vector and innner product spaces. Complex inner product spaces. Gram-Schmidt process. Unitary, normal and Hermitian matrices. Eigenvectors and eigenvalues. Diagonalisability. Schur's Lemma. Jordan Canonical form. Singular value decomposition. Introduction to Function spaces. Normed spaces and Banach spaces. Standard examples such as C([a,b]) and sequence spaces. Bounded linear operators and continuous linear functionals. Operator norms. Hilbert space and Riesz representation theorem. Numerical Linear algebra. Krylov subspace methods. Foundations of Conjugate Gradient method. Other iterative methods for solutions of systems of equations. Application of Krylov subspace methods to finding eigenvalues. Lanczos algorithm. QR factorization.
Prerequisites: MS4102

MS4214 - STATISTICAL INFERENCE
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: This course introduces students to the formalities of statistical inference with special emphasis on problems of estimation, confidence intervals, and hypothesis testing.

Syllabus: The notion of a probability model : examples, the need for estimation, confidence intervals and hypothesis tests. Inference for normal data : chi-squared, t, F, confidence intervals, hypothesis tests, two means, two variances. Central Limit Theorem : normal approximation to the binomial, application to inference for a single proportion and the difference between two proportions, the chi-squared test for independence. The likelihood function : the maximum likelihood estimate (MLE), iterative methods for calculating MLE.
Repeated sampling properties : bias, variance, mean squared error, Cramer-Rao theorem, efficiency, the large sample behaviour of maximum likelihood estimates. Interval estimation : pivotal quantities, confidence intervals, approximate.
Prerequisites: MS4213

MS4215 - ADVANCED DATA ANALYSIS
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: Applies the theory developed in MS4213 and MS4214 to the development of advanced data analytic methods with particular emphasis on linear models. Students are introduced to a range of statistical packages.

Syllabus: Simple Linear Regression : calibration, reverse prediction, regression through the origin, analysis of residuals, regression diagnostics, leverage and influence.
Matrix formulation of the linear model : Multiple regression, partial correlation, polynomial regression.
Analysis of Variance : One-way ANOVA, multiple comparisons, Two-way ANOVA, interactions, Analysis of covariance. Introduction to Generalized Linear Models including nonlinear regression, logistic regression and log- linear models.
Prerequisites: MS4213, MS4214

MA4617 – Introduction to Fluid Mechanics
ECTS Credits: 6 (Year 3 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: Change of title for existing module MA4607 INTRODUCTION TO APPLIED MATHEMATICAL MODELLING IN CONTINUUM MECHANICS. Content remains the same. Update of prerequisite module and lab hour added. To provide an introduction to the basic concepts of the mathematical modelling of fluid mechanics.

Syllabus: Continuum theory, balance of momenta, constitutive laws, elementary viscous flow, aerofoil theory, vortex motion, Navier-Stokes equations, very viscous flow, thin film flow, boundary layer theory.
Prerequisites: MS4404

Mathematics & Statistics

Year 4 Modules

MA4007 - EXPERIMENTAL DESIGN
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To familiarise students with the theory and applications of experimental design. Introduce the concepts of orthogonal functions and orthogonal arrays within experimental design. To analyse the Japanese method of experimental design and to compare it with traditional (linear models) design.

Syllabus: Multiple Regression, Residual analysis leverage and influence points. Analysis of variance: Expanding one, two factors in orthogonal polynomials. Estimation of factorial effect, resolution of variation. robust techniques. Statistical Experimental Design: Screening, factors, level, responses, full and fractional factorials, composite design, orthogonal arrays, signal to noise ratio, blocking confounding and D-optimal design. Product Design, parameter design, tolerance design.
Evolutionary Operations, response surface methodology, steepest ascent, canonical forms and the use of graphical techniques to classify surfaces.
Prerequisites: MA4004

MS4627 - MATHEMATICS OF NATURAL PHENOMENA
ECTS Credits: 6 (Year 4 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the concepts of modelling natural phenomena (biological and geophysical systems)

Syllabus: Evolutionary game theory: populations, strategies, evolutionary success Dimensional analysis: scaling, similarity. Fractals Waves: frequency, wave vector, phase velocity, group velocity Stability: steady solution of PDEs and small perturbations, harmonic disturbances, normal modes Boundary layer theory: flow near a plate, the Blasius problem.
Prerequisite: MA4607, MS4404

MS4027 - FUNDAMENTALS OF FINANCIAL MATHEMATICS
ECTS Credits: 6 (Year 4 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: This course is an introduction to financial mathematics. Using discrete-time stochastic models, the pricing and hedging
of financial derivatives in arbitrage-free markets is studied.

Syllabus: Introduction to Derivative Securities: Futures, Forwards, European, path-dependent, and American stock options. Introduction to Interest

Rate Derivatives, with a focus on bonds and Forward Rate Agreements.
Using arbitrage arguments to prove properties of options, inequalities, as well as the put-call parity. Introduction to binomial trees and risk-neutral valuation of options via replication arguments (delta-hedging).
Probability theory on finite sample spaces:
conditional expectations, martingales,
risk-neutral pricing. Use the concept of conditional expectation to formulate and prove the Fundamental Theorems of Asset Pricing I and II.
Value and super-replication of American put options.
Simple time-series models (ARMA(p,q)) for modelling and trading trends and mean-reversion.
Prerequisites: MS4035

MS4117 - DISCRETE MATHEMATICS 2
ECTS Credits: 6 (Year 4 Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: To give the student an understanding of the mathematics and apllications of Graph Theory. The applications to networks and to algorithms in Computer Science will be emphasised.

Syllabus: Graphs, directed graphs and their computer representation. Planar, Hamiltonian and Eulerian graphs. Graph algorithms (Kruskal, Dijkstra, DFS, BFS etc)
Graph coluring with applications to scheduling. Network flows and matchings. Other topics will be covered from time to time: Ramsey Theory, random graphs, Huffman codes, graph drawing, Petri nets.
Prerequisites: MS4111

MS4217 - STOCHASTIC PROCESSES
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Limited places available: 3
Mathematics & Statistics

Rationale and Purpose of the Module: The purpose of this module is introduce the students to the mathematical statistical analysis of probabilistic processes which develop over time.

Syllabus: 1. Recap on probability (copies, expectation, MGF, PGF) 2. Random Walks (differences equations & their solutions) 3.Markov Chains (discrete state space, discrete time) 4. Markov Processes (discrete state space, continuous time) 5. Queues (multi-sever queues, steady state solutions) 6. Survival Analysis (basic objects, covariates, MLE)
Prerequisites: MS4213

MS4407 - PERTURBATION TECHNIQUES AND ASYMPTOTICS
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
Mathematics & Statistics

Rationale and Purpose of the Module: To learn the basic concepts and techniques of asymptotic and perturbation methods.

Syllabus: Non-dimensionalisation, scaling, ordering, definition of asymptotic series, algebraic equations, integrals, Laplaces method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques.
Prerequisites: MS4403 , MS4404

Physics

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Physics Year 1 Modules

PH4011 - PHYSICS FOR ENGINEERS 1
ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: The module is an introductory physics course covering Mechanics, Heat, Electricity and Magnetism for engineering students.

Syllabus: Linear motion: vectors, projectiles, circular motion, relative velocity. NewtonÆs laws: force, work, power, momentum, friction, gravitation. Conservation of energy. Linear and angular momentum: conservation of momentum, collisions. Rotation of a rigid body:moments of inertia, kinetic energy, angular momentum. The laws of thermodynamics. Equilibrium and temperature, heat and internal energy, heat capacities and latent heat. The ideal gas, isotherms and adiabats. The Carnot engine: efficiency. Classical and microscopic entropy. Electricity: charge, electric field, Coulomb's law, Gauss's law. Electric potential, capacitance, Ohm's law, KirchhoffÆs Laws, dc circuit analysis, Joule heating. RC circuits. Magnetism: magnetic field, magnetic force and torque, the galvanometer. Ampere's law. Electromagnetic Induction: inductance. Faraday's law,Lenz's law, the generator and motor, back emf

PH4031 - PHYSICS FOR GENERAL SCIENCE 1
ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: An understanding of physics is essential in describing and understanding many processes and phenomena associated with chemical and life-science related disciplines. This one semester course is specifically designed to provide such students with a firm grounding in basic physics illustrated and reinforced with chemical, life and sports science related examples and applications.

Syllabus: Mechanics: units; kinematics; dynamics; motion in a circle; statics; the standard human; energy; momentum; simple harmonic motion; waves; sound and hearing. Materials: elasticity; pressure; buoyancy; surface tension; fluid dynamics. Heat: temperature; gases; phases; heat transfer; thermodynamics and the body, thermal conductivity. Electricity: static electricity; electric force and fields; electric potential and energy; dc circuits; radio frequency radiation; physiological effects of electricity. Magnetism: nmr, focus on medical imaging. Generator and motor. Optics: light; geometrical optics; physical optics; electromagnetic spectrum; Lasers; the eye and vision. Radiation: atoms; nucleus; ionising radiation; biological effects.

PH4041 - OPTICS
ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: The aim of this course is to develop and extend the students' knowledge of the principles of physical optics and introduce the students to contemporary optics.

Syllabus: Waves: wave description, wave equation, plane waves. Electromagnetic energy transport: EM waves, Poynting vector. Light in a dielectric: electron- oscillator model, refraction, absorption. Light at an interface: refraction, reflection, Fresnel equations. Polarization: polarisation states, Malus¿s law, birefringence, wave plates and compensators, optical activity, photoelasticity. Interferometry: wavefront splitting interferometers, amplitude splitting interferometers, multiple beam interference, applications. Diffraction: Frauhofer diffraction, Fresnel diffraction, Kirchoffs scalar diffraction theory. Fourier optics: Fourier transforms, optical applications. Coherence: visibility and mutual coherence. Contemporary optics: lasers, fibre optics, holography, nonlinear optics.
Prerequisites: PH4102

PH4051 - MEASUREMENT AND PROPERTIES OF MATTER

ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: The purpose of this module is to first introduce fundamental principles of physical measurement and data analysis which are important throughout the course and to introduce the mechanical and thermal properties of solids, liquids and gases.

Syllabus: Physics and Measurement: standards of length, mass, and time. Matter and model building. Density and atomic mass. Quantities, variables and relationships, dimensions and dimensional analysis, scientific notation, orders of magnitude and their estimation, problem solving. Experimental error: accuracy and precision, systematic and random errors, combination and propagation of error, significant figures. Elementary statistical treatment of random errors: standard deviation and standard error, the standard and
Gaussian distributions, the method of least squares. Static equilibrium and elasticity: the conditions for equilibrium. Elastic and thermal properties of solids: stress and strain, thermal expansion, Hookeċs law, Youngċs modulus, shear modulus, bulk modulus. Fluid mechanics: pressure, variation of pressure with depth, pressure measurements. Buoyant forces and Archimedes' principle. Fluid dynamics: Bernoulli's equation, other applications of fluid dynamics. The kinetic theory of gases: molecular model of an ideal gas, non-ideal gases, equipartition of energy. Heat transfer: conduction, convection and radiation.

PH4081 - NANOTECHNOLOGY 1
ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: The aim ofthis course is to combine basic science of size effect in materials in the micro to nanoscale dimension leading to various cutting-edge applications. The main objective is to introduce the students about the scientific importance and technological potential of developments in micro- and nano structuring of materials.

Syllabus: Solid State Physics: Size dependence of properties, Energy bands, Localized particles; Properties of individual particles: Metal nanoclusters, Semiconducting nanoparticles, Rare gas and molecular clusters and methods of synthesis. Methods of measuring properties: Structure, Microscopy and Spectroscopy. Carbon nanostructures: Carbon molecule, Carbon clusters, Carbon nanotubes, applications of Carbon nanotubes. Bulk nanostructured materials: Solid disordered nanostructures, Nanostructured Crystals.Nanostructured ferromagnetism: Basics of ferromagnetism, Effect of bulk nano-structuring of magnetic properties, Dynamics of nanomagnets, Ferrofluids, nanopores containment of magnetic particles, Nanocarbon ferromagnets, Giant and Colossal magnetoresistance. Quantum Wells, Wires and Dots: Preparation of quantum nanostructures, Size and dimensionality effect, Excitons, Single electron tunnelling. Applications: Nanomachines and Devices;
Microelectromechanical Systems (MEMS),
Nanoelectromechanical Systems (NEMS), Molecular and
Super molecular switches,
Magnetoelectronics. Applications: memory elements and devices, Nano magnetic sensors and actuators.
Prerequisites: PH4061, PH4021

PH4131 - MECHANICS/HEAT/ ELECTRICITY/MAGNETIS M
ECTS Credits: 6 (Year 1 Module)
Physics

Rationale and Purpose of the Module: This module provides an understanding of the basic concepts of the mechanical, thermal, electrical and magnetic properties of matter, knowledge of which is the foundation of the engineering and technology on which our present society is dependent. The principles covered in this course find application throughout the students degree programme. The principles are a key foundation of the degree programme and are extensively developed in theory

and practice in the subsequent years of the programme.

Syllabus: Linear motion: vectors, projectiles, circular motion, relative velocity. NewtonÆs laws: force, work, power, momentum, friction, gravitation. Conservation of energy. Linear and angular momentum:conservation of momentum, collisions. Rotation of a rigid body: moments of inertia, kinetic energy, angularmomentum.
The laws of thermodynamics. Equilibrium and temperature, heat and internal energy, heat capacities and latent heat. The ideal gas, isotherms and adiabats. The Carnot engine: efficiency. Classical and microscopic entropy. Electricity: charge, electric field, Coulomb's law, Gauss's law. Electric potential, capacitance, Ohm's law, KirchhoffÆs Laws, dc circuit analysis, Joule heating. RC circuits. Magnetism: magnetic field, magnetic force and torque, the galvanometer. Ampere's law. Electromagnetic Induction: inductance. Faraday's law,Lenz's law, the generator and motor, back emf.

Physics Year 2 Modules

PH4003 - MECHANICAL ENERGY
ECTS Credits: 6 (Year 2 Module)
Physics

Rationale and Purpose of the Module: Mechanical vibrations, simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations. Waves, transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves. Review of the principles orf mechanics: inertial frames, Newtons laws of motion, kinetic and potential energy. Rigid bodies: rotation and moments of inertia, angular momentum and kinetic energy, torque. Fluid dynamics: Bernoulli equation, equations of motion in integral form, equations of motion in differential form, kinematics, vorticity, potential flow, dimensional analysis, viscous flows, exact solutions, pipe flow, laminar boundary layers, boundary layer solution methods, turbulence. Fluid heat transfer and a thorough understanding of how these disciplines apply to the design and analysis of complex thermal fluid systems.
Applications to Ocean, Hydro and Wind renewable energy systems

PH4171 - MECHANICS
ECTS Credits: 6 (Year 2 Module)
Physics

Rationale and Purpose of the Module: The purpose of this module is to enhance students¿ understanding of key concepts and models associated with classical mechanics, vibrations and waves. The objectives are to develop the mechanics of single particles and of systems of particles including vibrations and waves and rigid bodies, and to introduce Lagrangian and Hamiltonian methods which also provide background for quantum mechanics.

Syllabus: Mechanical vibrations: simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations. Waves: transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves. Review of the principles of mechanics: inertial frames, Newtons laws of motion. Central forces: gravitation and Keplers laws, orbits, scattering. Systems of particles: centre of mass, linear momentum, rocket propulsion, kinetic energy. Rigid bodies: rotation and moments of inertia, angular momentum and kinetic energy, torque, principal axes, Eulers equations, gyroscopic motion. Noninertial reference systems: angular velocity vector, inertial forces, dynamics of a particle in a rotating coordinate system. Lagrangian mechanics: Hamiltons principle, generalised coordinates, Lagranges equations for conservative systems, Hamiltons equations.
Prerequisites: PH4131

Physics Year 3 Modules

PH4005 - INTRODUCTION TO COMPUTATIONAL PHYSICS

ECTS Credits: 6 (Year 3 Module)

Physics

Rationale and Purpose of the Module: Physicists at undergraduate level regularly deal with systems that have analytical solutions. However, in many instances analytical solutions are not possible and so these

systems require numerical solution. In addition, physicists frequently encounter large data-sets that require analysis that is unfeasible to analyse manually and is beyond the capabilities of a spreadsheet. A physicist should be able to identify these difficulties and implement the appropriate computational methods as necessary. This module allows students: - to develop programming skills appropriate to physics. - to recognise and solve problems from physics that require numerical techniques rather than analytical approaches.

to develop skills in the application of numerical techniques to physical problems and data analysis. - to enhance competency in the creation of electronically prepared scientific reports and the associated presentation of data.

Syllabus: [Introduction to computation in physics:] The necessity of numerical techniques in physics; How computers store and manipulate data; storage of numbers and roundoff error; comparison of common programming languages used in physics. [Introduction to Programming:] Basic syntax and structures in a programming language; functions; file reading/writing; data visualisation. [Software for writing physics reports:] Mathematical typesetting; Labels and references; citations; including figures and captions.

[Basic numerical techniques:] Root solving; matrix manipulations; curve fitting and interpolation; numerical integration and differentiation. [Advanced numerical techniques:] Solving ordinary differential equations; solving for eigenvectors and eigenvalues; the fast Fourier transform.

PH4061 - QUANTUM MECHANICS

ECTS Credits: 6 (Year 3 Module)

Physics

Rationale and Purpose of the Module: The pupose of the module is to extend the students understanding of quantum mechanics and to introduce students to applications of quantum mechanics in solid state physics.

Syllabus: Review of Schrodinger picture: barriers, wavepackets, scattering. Formalism: linear operators, harmonic oscillator, Dirac notation, postulates, the uncertainty principle. Quantum mechanics in three dimensions: the hydrogen atom, angular momentum, spin. Time independent perturbation theory: spin-orbit coupling, the Zeeman effect. The variational principle: the ground state of helium. Bonding: the hydrogen molecule, molecular orbitals. The WKB approximation: tunnelling. Energy bands: Bloch theorem, Kronig-Penney model, nearly free electron model, the tight binding model. Time dependent perturbation theory: two level systems, emission and absorption of radiation, spontaneous emission.

Prerequisites: PH4171, PH4042, PH4132

PH4613 - FORCES, POTENTIALS AND FIELDS

ECTS Credits: 6 (Year 3 Module)

Physics

Rationale and Purpose of the Module: The purpose of this module is to enhance understanding of key concepts and models associated with forces, potentials and fields. The objectives are to introduce/model kinematics, dynamics, planetary dynamics, fluid mechanics and electromagnetism using concepts such as magnitude, direction, rate-of-change, gradient,& fields.

Syllabus: Syllabus: Kinematics: review of vectors and scalars, displacement, velocity, flux, acceleration, rotation, frequency, angular velocity, planes of reference, rotation of axes, cylindrical and

spherical coordinates. Forces: stress, strain, pressure, tension, electricity, Gauss's Law, magnetism, work, potential, conservation of energy. Dynamics: Newton's Laws, forces as a function of time and space; rate of change of forces and other vectors, tangential forces, centripetal and centrifugal forces. and fields: visualisation of scalar and vector fields, maxima/minima, contour maps, smoothness, gradient, curvature, gravity, relativity, electromagnetism, divergence and vortices and their significance for electromagnetism, and fluid mechanics, Maxwell's Equations.
Prerequisites: MA4602, PH4131, PH4102

PH4021 - PHYSICS OF SOLIDS
ECTS Credits: 6 (Year 3 Module)
Physics

Rationale and Purpose of the Module: The purpose of the module is to introduce the student to the structure and properties of solid materials. The objectives are to discuss the major classes of solids and their properties and applications, and to present the physical principles needed for an understanding of the observations.

Syllabus: Structure & bonding: atomic structure; primary & secondary bonds, bonding forces & energies. Structures of metals, ceramics & polymers: crystal structures, Miller indices & reciprocal lattice, X-ray diffraction, non-crystalline solids, polymer molecules & configurations, thermoplastic & thermosetting polymers. Imperfections: point defects, dislocations.
Diffusion: diffusion mechanisms, steady and non-steady state diffusion. Mechanical properties: elastic deformation, mechanical behaviour of metals, ceramics & polymers. Deformation & strengthening: dislocations in metals & ceramics, hardness twinning, Hall-Petch effect, deformation & strengthening of polymers. Failure: fracture &

toughness, fatigue, creep, wear. Phase diagrams: Gibbs¿ phase rule, binary & ternary phase diagrams, interpretation of phase diagrams. Phase transformations: homogeneous & heterogeneous nucleation, growth, metastable & equilibrium states. Applications of materials: ferrous & non-ferrous alloys, glasses & ceramics, plastics & elastomers.
Prerequisites: PH4171, PH4042

PH4071 - SEMICONDUCTORS 1
ECTS Credits: 6 (Year 3 Module)
Physics

Rationale and Purpose of the Module: The purpose of this module is introduce students to the fundamentals of semiconductor process technology focusing on silicon technology and integrated circuit processes.

Syllabus: Semiconductor technology: overview of advances in integrated circuits, the road map, Moore¿s law. General nature of semiconductor materials: elemental materials and their uses in research and industry, compound materials and alloys and their applications, influence of purity on electrical properties of semiconductors. Structure of semiconductors: amorphous, crystalline and polycrystalline solids, unit cells, lattice types, body centred cubic, face centred cubic, the diamond lattice, Si and Ge, Miller indices. Electrical properties: contribution of mobility and free carrier density to resistivity, electrical properties of conductors, semiconductors and insulators. Semiconductors: pure semiconductors, important elements from group 3, group 4 and group 5 of the periodic table, valence electrons, covalent bonding, p- type semiconductors and n-type semiconductors, energy levels for p-type and n-type semiconductors, intrinsic energy level, intrinsic carrier density, thermal equilibrium, carrier lifetime. Doping of silicon: donors and acceptors, majority carriers and minority carriers, hot point probe, 4-point probe sheet resistance, carrier transport. Lithography: lithography processes (light sources, exposure systems, photoresist), aerial image, latent image, relief image, pattern definition, pattern transfer (etching, deposition, implantation etc.). Optical lithography techniques: optical resists, key resist parameters, positive and negative resist, DNQ system and deep UV system. Resist processing: priming, spinning, baking, exposing, developing, hard baking, stripping. Exposure: types of exposure (UV light to deep UV, X-rays, electrons, ions),

method of exposure, development (positive, negative). Printing: Fresnel system, contact and proximity printing, Fraunhofer system, projection printing, advantages and disadvantages. Advanced lithography]: focused ion beam, electron beam, etc. Thermal oxidation of silicon: the oxidation process, type of furnaces, wet oxidation,dry oxidation, factors influencing oxidation rates, silica film thickness measurements. Thin film deposition: evaporation, sputtering, chemical vapour deposition. Diffusion: diffusion processes, constant source diffusion, limited source diffusion, solid solubility limits. Epitaxial silicon deposition: LPCVD amorphous silicon, importance of epitaxy. Ion implantation: implantation technology, channelling, lattice damage and annealing.
Prerequisites: PH4042, PH4132

Physics Year 4 Modules

PH4607 - SOLID STATE PHYSICS 1
ECTS Credits: 6 (Year 4 Module)
Physics

Rationale and Purpose of the Module: The purpose of this module is to enhance the students' understanding of key concepts in solid state physics and the quantum theory of solids.

Syllabus: Crystal dynamics: sound waves, the one dimensional crystal, normal modes, lattice vibrations and phonons, Bloch waves. Semiconductors: electrons and holes, intrinsic and extrinsic behaviour, Fermi energy, band structure, effective mass, excitons and plasmonics. Transport properties and electrodynamics of metals: conductivity, Hall effect, cyclotron resonance, Debye model of specific heat. Dielectric properties: Drude model, polarons and hopping conduction. Non-equilibrium carrier densities: continuity equations, neutrality. Photonic devices: photodiodes, LEDs, homojunction and heterojunction LASERs, photonic crystals. Optical Properties: Brillouin scattering, crystal optics, infrared absorption, optical phonons, Raman scattering. Prerequisites: PH4061

PH4018 - MEDICAL INSTRUMENTATION
ECTS Credits: 6 (Year 4 Module)
Physics

Rationale and Purpose of the Module:

* To introduce the special considerations for electric/electronic instruments attached to patients for the purposes of diagnosis or therapy. * To introduce the medical device directive and the regulatory environment. * To give the student a working knowledge of the operation of some medical equipment * To introduce the student to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes. * To provide a working knowledge of the operation of this equipment.

Syllabus:

Introduction to regulatory bodies in the EU and US: CE, FDA etc.; 21 CFR, 510k, Medical Device Directive, Investigational Device Exemptions; Electrical isolation standards, implementation options; Laser Safety - EN 60825. Measurements in biological systems: obtaining a reference, ratiometric analysis, clinical requirements, Physiological monitoring; Invasive/non-invasive, Probes - Electrical, fibre optic, non-contact. Vital signs monitoring: ECG- Electro cardio gram, electrical function of the heart; EEG- Electro encephalo gram, electrical function of the brain; EMG- Electro myelo gram, electrical function of the muscle; Pulse Oximetry, optical measurement of arterial blood oxygen saturation; MAP- mean arterial pressure. Introduction to radiation transport in tissue: absorption/scattering theory (Mie, Rayleigh Gans), bulk scattering and bulk absorption, anisotropy, typical values for radiation transport properties, Monte Carlo modelling.X-RAY/CT: X-RAY generation and propagation, Introduction to tomography, Computed Tomography - Slicing the living human body. Ultrasound: Doppler effect, high frequency ultrasound, limitations. MRI/MRS: Magnetic Resonance basics, the hydrogen nucleus, proton

spin and quantum mechanics; 3D map of hydrogen atoms and hence content of the sample volume, Properties and amount of water in tissue, distinction between contrast and content imaging.

PH6031 - PHYSICS OF MEDICAL INSTRUMENTATION

ECTS Credits: 6 (Year 4 Module)
Physics

Rationale and Purpose of the Module: The purpose of this module is to introduce the special considerations for electric/electronic instruments attached to patients for the purposes of diagnosis or therapy. The module will also introduce the medical device directive and the regulatory environment for medical devices. As part of their studies the students will develop a working knowledge of the operation of some medical equipment, as well as being introduced to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes, and to provide a working knowledge of the operation of this equipment.

Syllabus: Introduction: Principles and applications of instrumentation in medicine, One Health Approach; System approach to anatomy and physiology in relation to circulatory, respiratory, musculoskeletal and neurovascular systems; Biomedical signals and detections through generalised instrumentation principles, medical instrument design criteria and constraints; Standards and Regulations; Regulatory laws, practices and jurisdictions in the European Union and the United States of America. Physiological Transducers: Physico-chemical principles of transduction, selection of transducer types; specific examples of principles and operations of physiological transducers: displacement transducers, LVDT and encoders, piezoelectric transducers, strain gauge, temperature measurement using resistors, thermistors and infrared thermometry. Interactions of ionising radiations with matter & dosimetry: Sources of ionising radiation and diagnostic radiology; X-ray instrumentations, characteristics, exposure and control, X-ray interactions with matter, Deterministic and Stochastic effects of exposure to ionising radiation, Radiation dosimetry and dosimeters, Kerma, absorbed, equivalent and effective dose; Radiation safety and regulations. Bioelectric potential: Bioelectricity and measurements; Electricity and biological building blocks; Cell potentials, Nernst and Goldman Equations, Electrical stimulation; bioelectric signals, Electrode/Tissue interface, Electrode/Skin interface. Biosensors and Non-electronic medical devices: definitions and principles of biosensors, critical care analytes and their sensing, principle and construction of a pH meter, oxygen and carbon di oxide sensors; types of medical devices, minimally invasive procedures and devices: guidewires, catheters, stents, knee and hip implants. Examples of medical instruments, operating principles, applications, regulatory framework and recent developments: ECG- Electro cardiogram; EEG- Electro encephalogram, Pulse Oximetry, X-ray Computed Tomography, Ultrasound imaging and therapy; Magnetic Resonance Imaging and theranostics, feedback controlled glucose sensor and insulin pump.

PH4091 - PHYSICS OF MODERN MEASUREMENT

ECTS Credits: 6 (Year 4 Module)
Physics

Rationale and Purpose of the Module: The purpose of the module is to provide an introduction to the physical principles and applications of advanced surface analytical techniques.

Syllabus: Microscopy: image formation, resolution, light microscopy, near-field scanning optical microscopy (NSOM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning transmission electron microscopy (STEM), scanning tunnelling microscopy (STM), scanning force microscopy (SFM). Diffraction and scattering:

elastic and inelastic scattering, Braggċs law, the reciprocal lattice, Laue equations, x-ray diffraction (XRD), neutron diffraction, selected area electron diffraction in the transmission electron microscope (SAD), electron probe x-ray microanalysis (EPMA), extended x-ray absorption fine structure (EXAFS), surface extended x-ray absorption fine structure and near edge x-ray absorption fine structure (SEXAFS/NEXAFS), low-energy electron diffraction (LEED), reflection high-energy electron diffraction (RHEED), particle-induced x-ray emission (PIXE), x-ray fluorescence (XRF). Spectroscopy]: vibrations in molecules and solids, selection rules, energy-dispersive x-ray spectroscopy in the scanning electron microscope (EDS), electron energy-loss spectroscopy in the transmission electron microscope (EELS), x-ray photoelectron spectroscopy (XPS), ultraviolet photoelectron spectroscopy (UPS), Auger electron spectroscopy (AES), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, nuclear magnetic resonance (NMR), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), inductively coupled plasma mass spectroscopy (ICPMS), positron annihilation spectroscopy (PAS).
Prerequisites: PH4132, PH4021

PH4161 - ATOMIC / MOLECULAR / LASER PHYSICS ECTS Credits: 6 (Year 4 Module)
Physics

Rationale and Purpose of the Module: This module develops the student's knowledge of atomic and molecular physics, particulary where these are relevant to spectra and laser physics. Based on this the module introduces the fundamentals of laser physics and laser applications including holography.

Syllabus: Atomic structure: the hydrogen atom, energy level diagram and the origin of spectra, many-electron atoms, the influence of external fields, hyperfine structure, isotopic shifts, the shell model, X-ray spectra. Molecules: diatomic molecules, vibrational and rotational states, complex molecules, vibrational modes. Molecular emission and absorption spectra in the visible and infrared. Fundamentals of laser action: cavities, laser media, gain, losses, cavity linewidths, broadening mechanisms. Spatial and temporal properties: Gaussian beams, cavity modes, mode locking and Q switching, solid state lasers. Laser Applications: industrial, medical, data storage, holography and holographic techniques, laser safety.
Prerequisites: PH4132, PH4041

Physics Year 5 Modules

PH6021 - PREDICTIVE BIOMOLECULAR MODELLING TOOLS

ECTS Credits: 6 (Year 5 Module)
Physics

Rationale and Purpose of the Module: This module will introduce the students to the computational physics, chemistry and biology underpinning the latest breakthroughs in disease treatment and regenerative medicine. With a particular focus on drug-protein, protein-protein, and protein-surface interactions, students will gain a molecular level understanding of how to re-engineer advanced molecular biology processes including genetic code translation, neurodegenerative disease progression, and cell growth on tissue engineering scaffolds. The required high-performance computing hardware, molecular modelling software, and data analytics tools will be demonstrated and discussed through interactive online tutorials.

Syllabus: Predictive modelling of biological materials, from genomics to proteomics to molecular structures - amino acids, peptides, proteins, antibodies, nucelotides and sugars. Nanoscale physics underlying molecular interactions: Electrostatic interactions, Solvation, van der Waals interactions, Surface interactions, Re-engineering biomolecular structures. Predictive modelling of novel nanomedicines: Expanding the genetic code, Blocking aggregation of neurotoxic proteins, Sculpting anti-cancer drugs. Student

online presentations on topics such as modelling ion trafficking through transmembrane proteins, molecular-level engineering of sugar-siRNA complexes as gene delivery vector, and preserving antibody structures using computationally designed excipients.

PH6051 - ADVANCED BIOPHYSICAL CHARACTERISATION TECHNIQUES

ECTS Credits: 6 (Year 5 Module)
Physics

Rationale and Purpose of the Module: To develop a fundamental understanding of how modern biochemical and biophysical characterization techniques work. To understand the relationship between molecular structure and function of biological materials. To illustrate these concepts through discussion of their application to biological complexes.

Syllabus: X-ray crystallography determinations of protein structure; Determining glycosylated and phosphorylated protein structures; Nuclear Magnetic Resonance methods to resolve protein structures; Small Angle X-ray Scattering methods; Cryo-electron microscopy (cryo-EM); Resolution of large multi-protein assemblies; Discussion of topics such as resolving biomolecular structures in biological fluids, proteolysis, ultrafast laser spectroscopy, and structural genomics; The special case of Intrinsically Disordered Proteins; Mapping assembly from protein monomers to oligomers to protofibrils to plaques; Determining nucleotide structures; Resolving nucleotide:protein and nucleotide:sugar complexes

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Engineering

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Engineering Year 1 Modules

ME4001 - INTRODUCTION TO ENGINEERING 1
ECTS Credits: 3 (Year 1 Module)
School of Engineering

Rationale and Purpose of the Module: To introduce the profession of engineering, develop non-technical skills such as report writing, encourage a spirit of research and self-study, develop students knowledge of the use of engineering units

Syllabus: Overview of the engineering disciplines currently being offered by the Mechanical and Aeronautical Engineering department: The profession (Mechanical, Aeronautical, Biomedical, Design), real-life engineering examples, skills required, career opportunities and career progression. Materials used in engineering products, alloys of iron, steel and aluminium, ceramics, polymers, composites; materials specific to biomedical and aeronautical applications. Ethics in engineering; report writing including information sources, plagiarism; units and error analysis; problem solving techniques; time management; sustainability; intellectual property rights and the patent process.

PT4011 - INTRODUCTION TO TECHNOLOGY MANAGEMENT
ECTS Credits: 6 (Year 1 Module)
Limited places available: 5
School of Engineering

Rationale and Purpose of the Module: The purpose of this module is to introduce students to the concept of Technology Management and in doing so to provide them with an understanding of what they will be studying during their 4-year degree and why it is relevant. This module will provide students with a framework for understanding technology management activities and tools. The module will examine how firms acquire, exploit and protect technology resources. Students will be introduced to a set of tools that can be used in managing technology. Many of the concepts introduced in this module will be explored in greater detail in future modules.

Syllabus: Technology Strategy: Integrating technology and strategy, design and evolution of technology strategy, acquiring and selecting new technologies, technological competencies and capabilities. Technology Forecasting and Road Mapping: Technology S-curves, patterns of innovation, Forecasting techniques: Scenario analysis, EMV, Decision Trees, Technology Trajectories Technology Development: new product development, stage gate processes, market research methods, prototyping Incremental vs. disruptive development, technology transfer, Technology Portfolio Planning: Value Analysis/Value Innovation, Life-cycle models, Patent Analysis, product selection.

PT4121 - COMMUNICATION GRAPHICS
ECTS Credits: 6 (Year 1 Module)
(Lab-Based Module)
Fundamentals of technical drawings and graphic communication needed
School of Engineering

Rationale and Purpose of the Module: This module provides an introduction to the fundamentals of the universal language of engineering, design and technology. The essential conventions, principles and concepts of the graphic language are explored through visualising and solving problems using a combination of freehand sketching and manual drawing communication techniques. The visualisation and graphic skills developed are essential prerequisites for 2D and 3D CAD. To promote and nurture spatial-visualisation and spatial-reasoning abilities critical to the success of technology professionals.
To present the standards and conventions of engineering drawing essential to the correct creation and interpretation of graphical representation used in engineering communication and documentation.

To foster manual drawing skills, especially sketching, which are essential to design and communication success.

Syllabus: Fundamentals of technical drawings and graphic communication. Spatial visualisation for design and engineering. Projection systems - multi-view drawings, orthographic, isometric, oblique and perspective projection. Freehand Sketching of everyday objects - translation of simple drawings. BS ISO 128 and 129 conventions and general principles relating to technical drawings. Sectional and Auxiliary views. Dimensioning and Tolerancing. Detail and assembly drawings of engineering components. Introduction to the ISO system of limits and fits. Data sheet BS4500A: hole basis system. Engineering working drawings. Intersection and Developments.

WT4401 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 1

ECTS Credits: 6 (Year 1 Module)

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to every aspect of the technology of domestic low-rise construction, and to present this in a rational and logical progression reflecting the construction process.

Syllabus: Introduction to the Building Regulations and Technical Guidance Documents. Site works, temporary works, subsoil drainage, excavations, scaffolding. Radon problems and prevention. Radon membranes and sumps. Substructure construction techniques, foundations û strip, raft and piled, concrete. Damp proof courses and membranes. Superstructure construction techniques, stonework, brickwork, blockwork, cavity walls. Timber framed construction. Components. Site control. Insulation and damproofing. Floors - suspended timber, raised access, precast concrete, hollow block, waffle slabs. Roofs û timber, flat and pitched, tiling, asphalt flat roofs, roof lights and ventilation. Stairs û timber, reinforced concrete and precast concrete. Detailing of opes, eaves and other junctions. Sound insulation û airborne, impact & flanking. Soundproofing. Thermal insulation, thermal bridging, condensation and draughtproofing. Basic U-value calculation.

Engineering Year 2 Modules

CE4014 - HYDRAULICS AND WATER ENGINEERING

ECTS Credits: 6 (Year 2 Module)

Limited places available: 5

School of Engineering

Rationale and Purpose of the Module: This module introduces the theory and practice of hydrology and modern water engineering. It covers water in the natural hydrological cycle and the fundamental concepts in water treatment technologies in the context of sustainable development.

Syllabus:

Hydrology: Hydrological cycle catchment hydrology, water balance and flow duration. Rainfall measurement, catchment and unit hydrographs, synthetic hydrographs and their application. Hydrometry, reservoir routing and flood frequency analysis. Groundwater movement, extraction and protection.

Water Treatment: Water characteristics and water quality. Water demand and use, and global water issues. Water treatment and design processes including preliminary treatment, settlement, coagulation / flocculation, filtration, adsorption processes, disinfection and sludge treatment.

CE4043 - STRUCTURAL ENGINEERING DESIGN 2

ECTS Credits: 6 (Year 2 Module)

School of Engineering

Rationale and Purpose of the Module: This module will build on fundamentals in structural

engineering design taught in Year 1. The learning context is a design project conducted in a studio environment. Studio learning is supported by a combination of lecture and laboratory sessions that feature realistic engineering problems. Students will encounter fundamental concepts of stress, strain and internal force and, as part of an iterative design process, apply this knowledge to analyse simple statically determinate structures. Students will interpret the results of structural analyses and apply them during the design process to validate proposed solutions.

Syllabus: • Define direct and shear Stress & Strain; • Apply Mohr's Circle to calculate stress at a point on various planes; • Explain the concept of shear stress; • Explain the concept of shear flow and apply it to the analysis of a simple torsion problem; • Establish fundamental equilibrium relations between shear and bending moment in a beam; • Draw the bending stress distribution assumed in simple beam bending theory; • Derive and draw the shear stress distribution in a beam; • Derive and explain the use in analysis of the 2nd Moment of Area of a section in bending; • Derive and explain the meaning of the engineer's equation of bending; • Analyse simply supported and fixed end beams under point and uniform loads and draw the corresponding bending moment and shear force diagrams; • Using Euler's theory, establish the elastic critical load for an axially loaded column; • Using an iterative process, develop a structural solution for an assigned design problem with constraints. Carry out a structural analysis of design proposals. Apply quantitative design criteria to validate the design. Build and test prototype scale models.

DM4003 - OPERATIONS MODELLING (ENG)

ECTS Credits: 6 (Year 2 Module)

School of Engineering

Rationale and Purpose of the Module: Understand the role of operations in both production and service enterprises. Introduce Lean thinking and structured operations improvement tools. Introduce a range of quantitative methods and highlight their application in the decision making process for solving real world problems. Provide an understanding of optimal decisions under constraints. Provide an understanding of design and analysis of operations under uncertainty. To provide students with modelling and software capabilities that can be applied to operations design and analysis.

Syllabus: Lean Thinking and Operations Introduce students to lean thinking and operations improvement tools used within DMAIC (Define-Measure-Analyze-Improve-Control) projects. Related lean thinking to operations modeling methods. Operations Modeling - Software: Introduce and provide students with base skills to use software to solve operations optimization models. The focus is primary on introducing the student to spread sheet modeling, but brief introductions to other modeling and optimization software will be given. Students will apply software modeling skills obtained here to subsequent topics. Operations Modeling Under Constraints Basic definition of Linear programming, demonstrate method via graphical method, model formulation applications in operations. Simplex method, Artificial starting solution method, interpretation of simplex tableau, sensitivity analysis. Transport model, Assignment model, Shortest Route model, Network Minimisation model, Maximum Flow Model, Transshipment model Introduce binary and integer applications in operations analysis, integer solution methods such as branch-and-bound and meta heuristics solution methods. Decision Making Under Uncertainty Introduce decision making under uncertainty Introduce basics of simulation using spreadsheets. Introduce basic queuing and inventory models.

ME4213 - MECHANICS OF SOLID 1

ECTS Credits: 6 (Year 2 Module)

School of Engineering

Rationale and Purpose of the Module: To analyse stresses and strains in a uniaxial stress field and stresses in a bi-axial stress field. To understand how to evaluate stresses in a cylindrical beam

subjected to point loads, uniformly distributed loads, couples and torques. As (2) for beams of symmetrical section without torsion.
To understand the significance of the connection between the elastic constants. To understand the approach to the analysis of statically indeterminate problems.

Syllabus: Uniaxial stress and biaxial strain fields. Constitutive relations. Shear force and bending moment diagrams, Bending of beams, Transverse shear stress in beams, Composite beams, Thermal stress, Torsion of cylindrical sections, Analysis of stress at a point in 2D, Principal stress and Mohr's stress circle, Thin cylinders and thin spherical vessels.

ME4112 - ENGINEERING MECHANICS 2
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
Limited places available: 5
Restrictions: Must have experience with MATLAB, Python or similar software
School of Engineering

Rationale and Purpose of the Module: The overall objective of the course is to enable students to apply Newtons Laws of Motion (in particular the second law) to objects in motion with non-zero acceleration. The course thus goes beyond the topic of statics, which was examined in Engineering Mechanics 1 (ME4111), and analyses the kinematics of bodies in motion, the rules used to describe the motion of bodies in space, and the kinetics, which relates the motion of bodies to the forces which give rise to the motion. The study of accelerating bodies is often referred to as Dynamics, as opposed to the study of bodies in equilibrium, which is referred to as Statics.

Syllabus: Application of Newtons Laws to particles and rigid bodies not in equilibrium (Dynamics) Kinematics of particles, rectilinear and curvilinear motion, Cartesian, polar, normal and tangential co-ordinates; relative motion. Kinetics of particles, work, kinetic energy and potential energy, impulse and momentum. Collections of particles, moment of inertia. Kinematics of rigid bodies in plane motion, rolling wheels, mechanisms.
Kinetics of rigid bodies in plane motion, translation of rigid bodies, rotation about a fixed point and general plane motion
Prerequisites: ME4111

ME4424 - AERODYNAMICS 1
ECTS Credits: 6 (Year 2 Module)
School of Engineering

Rationale and Purpose of the Module: To give the student a comprehensive understanding of incompressible flow together with an introduction to compressible flow with application to aircraft.

Syllabus: Review of governing equations, application of equations to fluid flow processes Thin aerofoil theory, aerodynamic coefficients Finite span wings, lifting line theory, vortex flow, induced drag, downwash, lift distribution Boundary layer separation and control Compressible flow, normal and oblique shock waves, aerofoils in compressible flow Introduction to experimental techniques

Prerequisites: ME4412

ME4523 - THERMODYMANICS 1
ECTS Credits: 6 (Year 2 Module)
School of Engineering

Rationale and Purpose of the Module: To introduce the First and Second Laws of Thermodynamics and to apply these laws in the analysis of basic engine cycles

Syllabus: First law of Thermodynamics with applications to non-flow and to steady flow processes. General Thermodynamic relationships and properties.
Statements of the Second Law of Thermodynamics including Carnot efficiency. Corollaries of the Second Law of Thermodynamics including the Clausius inequality and concepts of irreversibility.

Otto, Diesel and Dual reciprocating engine cycles. Joule cycle with applications to simple gas turbine engines.

PT4013 - OPERATIONS MODELLING

ECTS Credits: 6 (Year 2 Module)

School of Engineering

Rationale and Purpose of the Module: Understand the role of operations in both production and service enterprises. Introduce Lean thinking and structured operations improvement tools. Introduce a range of quantitative methods and highlight their application in the decision-making process for solving real world problems. Provide an understanding of optimal decisions under constraints. Provide an understanding of design and analysis of operations under uncertainty. To provide students with modeling and software capabilities that can be applied to operations design and analysis.

Syllabus: Lean Thinking and Operations Introduce students to lean thinking and operations improvement tools used within DMAIC (Define-Measure-Analyze-Improve-Control) projects. Related lean thinking to operations modeling methods. Operations Modeling - Software: Introduce and provide students with base skills to use software to solve operations optimization models. The focus is primary on introducing the student to spread sheet modeling, but brief introductions to other modeling and optimization software will be given. Students will apply software modeling skills obtained here to subsequent topics. Operations Modeling Under Constraints Basic definition of Linear programming, demonstrate method via graphical method, model formulation applications in operations. Simplex method, Artificial starting solution method, interpretation of simplex tableau, sensitivity analysis. Transport model, Assignment model, Shortest

Route model, Network Minimisation model, Maximum Flow Model, Transshipment model. Introduce binary and integer applications in operations analysis, integer solution methods such as branch-and-bound and meta heuristics solution methods. Decision Making Under Uncertainty. Introduce decision making under uncertainty. Introduce basics of simulation using spreadsheets. Introduce basic queuing and inventory models.

PT4213 - DRAWING AND CAD

ECTS Credits: 6 (Year 2 Module)

School of Engineering

Rationale and Purpose of the Module: To introduce the students to the standards, conventions and projection systems used to communicate design information.

To develop the students technical communication abilities To introduce students to the principles and concepts of parametric solid modelling using SolidWorks. To introduce students to best practice sketching, modelling and assembly strategies for design intent as part of the design process.

Syllabus: Engineering drawing communication. Visualisation. Technical sketching. Conventional representation. ISO 128 and 129. Projection systems. Auxiliary and sectional views. Dimensioning. Detail and assembly drawings. Using the SolidWorks user interface. File management and document templates. Introduction to robust sketching for design intent. Sketch relations. Basic part modelling using extruded and revolved features. Open and closed profiles. Thin features. Feature end conditions. Capturing design intent through dimensioning and relations. Applied features. Basics of bottom-up assembly modelling. Basic mates. Creating basic Part and Assembly drawings. Edrawings for visualisation and communication. Links from SolidWorks to Excel, 2D CAD, CAM and RP systems. Edrawings

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PT4423 - 2D CAD

ECTS Credits: 6 (Year 2 Module)

(Lab-Based Module)

This module introduces students to the concepts, principles and techniques of 2D CAD drawing and design using AutoCAD. Basic understanding of engineering technical drawings is required

School of Engineering

Rationale and Purpose of the Module: 2D CAD drawings are vital to the communication of engineering design information. 2D CAD generated drawings are use in such diverse areas as architectural design, mechanical part design, facilities layout, service and circuit diagrams and technical publications.
This module introduces students to the concepts, principles and techniques of 2D CAD drawing and design using AutoCAD. The adoption of best practice strategies for the efficient and effective use of CAD for creating, editing and viewing geometry as part of the design process are stressed throughout the module.

Syllabus: Contemporary CAD software with particular reference to AutoCAD; hardware, software and operating systems; the AutoCAD drawing environment: absolute and relative coordinates, units and limits; CAD tools and drawing setup; drawing templates; the UCS; basic and advanced drawing and editing commands; introduction to layers; creating and using blocks Wblocks, attributes and symbol libraries; communicating engineering and design details; dimensioning and dimensioning styles; text styles; toleranced dimensioning; sectional views and hatching; tool palettes; Paper Space layouts; customisation techniques; customising toolbars and toolbar macros; isometric drawing. CAD construction techniques; plotting; sheet sets; raster images, multilines; using DesignCenter; DWF drawings; Introduction to 3D geometry.
Prerequisites: PT4121

WT4003 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 2
ECTS Credits: 6 (Year 2 Module)
School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to industrial, high-rise and construction practice and technology Key objectives
Provide knowledge of
Organising and selecting resources needed to successfully complete the project * The principles of erecting large structures and the various forms they take. Internal and external components of industrial and high rise structures

Syllabus: Site works, site layout, electricity on building sites; Plant and equipment; Substructure construction, ground water control, deep trench excavations, cofferdam and caissons, tunnelling and culverts; Underpinning, piled foundations; Demolition and temporary works, Portal frames; Introduction to highrise construction, Introduction to fire protection; Claddings to framed structures; Formwork systems; Pre-stressed concrete; Industrial buildings.
Prerequisites: WT4502, WT4401

WT4503 - STRUCTURAL MECHANICS
ECTS Credits: 6 (Year 2 Module)
School of Engineering

Rationale and Purpose of the Module: To develop the student's understanding of: force systems criteria for structural design,structural behaviou .

Syllabus: SI units and manipulation of formulae, sources and types structural loading, reactions and supports, free body diagrams, shear force and bending moment calculations, static determinancy and indeterminancy, qualitative analysis of beams and frames, stability and analysis of pin jointed frames, section properties, engineers equation of bending.
These topics will be covered through lectures, tutorials, experimentation and problem solving projects.

WT4505 - BUILDING ECONOMICS
ECTS Credits: 6 (Year 2 Module)
School of Engineering

Rationale and Purpose of the Module: The overall aim of this module is to illustrate the

application of economic principles to the building and construction process.
Specific objectives include providing the student with;
An overview of the construction industry and its role in the economy An understanding of the construction firm and its management from an economic perspective
The economic considerations in evaluating building projects and making decisions.

Syllabus: The construction industry, its economic development, structure and role in the economy. Construction as a production process. Management of firms, costs, revenues and markets from the point of view of economists and managers. Strategic decision making in property development and project appraisal and feasibility studies. Linking the economics of the production process of construction to the economics of its output, buildings and structures of the built environment. Cost modelling techniques, cost and price forecasting, cost product and process modelling, dealing with uncertainty. Building design, its interaction with the construction process in determining the cost and quality of buildings. The economics of buildings essential resources, energy efficiency and its cost. Cost limits and values, determining value for money Commercial values and the property market. Prerequisites: WT4804

Engineering Year 3 Modules

CE4045 - PROFESSIONAL PRACTICE 1
ECTS Credits: 6 (Year 3 Module)
Restrictions: This module can only be selected if all other civil engineering Year 3 autumn semester modules are selected (CE4005, CE4015, CE4025, CE4045, CE4055)
School of Engineering

Rationale and Purpose of the Module: The objective of this module is to engage the student in professional practice skills through the medium of problem-based learning. The module involves an overview of Health and Safety in the construction industry and project work integrates core skills in CAD and land surveying in advance of cooperative education in semester 6. The module is 100% continually assessed and non- repeatable.

Syllabus: The Planning System: Making a simple planning application. Health & Safety: Overview of health & safety in the construction industry. Statutory framework for the construction industry. Roles and responsibilities of the civil engineer. Processes and procedures, risk assessments. Computer Aided Drafting: Overview of current industry practice and trends in drawing and integration of CAD with the design process. Operate a proprietary 2-D CAD system to produce survey and planning drawings. Operate a proprietary 3-D CAD system to produce a rudimentary 3D model and associated plan and sections. Land Surveying: Overview of land surveying methods and principles. Overview of GIS. Surveying and setting out using total station and levelling equipment operation, data recording and production of a topographical survey drawing. Setting out of a simple building.

CE4055 - REINFORCED CONCRETE DESIGN 1
ECTS Credits: 6 (Year 3 Module)
Restrictions: This module can only be selected if all other civil engineering Year 3 autumn semester modules are selected (CE4005, CE4015, CE4025, CE4045, CE4055)
School of Engineering

Rationale and Purpose of the Module: To master the concepts and processes involved in the design of structural elements (beams, columns, slabs etc.) in reinforced concrete.

Syllabus: Properties of reinforced concrete (RC): Principles of limit state design; Analysis of the RC section; stress-strain characteristics of steel and ultimate strain of concrete, stress block and strain profile, balanced, over- or under-reinforced sections; Design of single span, flanged and

continuous RC beams; flexure and shear resistance; Serviceability and durability of reinforced concrete; Limiting span/effective depth ratios; Choice and initial sizing of appropriate RC slabs of various type; Detailed design of reinforced concrete elements to Eurocode-2 including: Slabs (one-way spanning), Beams (flanged and continuous), Columns (Short) and Pad Foundations; Punching shear resistance; principles of axial load-moment interaction diagram; RC Detailing; bond, anchorage and curtailment

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CE4005 - STRUCTURAL THEORY

ECTS Credits: 6 (Year 3 Module)

Restrictions: This module can only be selected if all other civil engineering autumn semester modules are selected (CE4005, CE4015, CE4025, CE4045, CE4055)

School of Engineering

Rationale and Purpose of the Module: Plastic analysis, Elastic buckling theory for columns, effect of end conditions and imperfections. Beams on an elastic foundation.

Static and kinematic indeterminacy, internal and external stability. Virtual work theorems, moment area method, stiffness and flexibility methods, influence coefficients and reciprocal theorems. Application of virtual work methods in structural analysis. Approximate iterative solutions including moment distribution, Introduction to structural dynamics.

CE4015 - SOIL MECHANICS

ECTS Credits: 6 (Year 3 Module)

Restrictions: This module can only be selected if all other civil engineering autumn semester modules are selected (CE4005, CE4015, CE4025, CE4045, CE4055)

School of Engineering

Rationale and Purpose of the Module: It is necessary for buildings, regardless of size and form to be safely supported by the ground. If this fundamental requirement is not satisfied the building may experience damaging settlement or worse ... Total collapse. Such consequences effectively mandate that every engineer becomes proficient in the basics of soil mechanics. This module builds on the material covered in WT4014. It is designed to challenge the student to master the key concepts in soil mechanics and apply these concepts in projects and self-directed learning.

Syllabus: Basic mechanics Stresses, strains; plane, axial symmetry, 2-D and 3-D conditions - stress distribution; analysis of stress and strain using Mohr's circle; stiffness and strength. * Compressibility and Consolidation 1-D consolidation theory; Solutions and applications for 1-D consolidation in shallow foundation design; Consolidation Time & rate effects; Determination of Cv, Cc and Cs from oedometer tests; Interpretation of OCR. Calculation of foundation settlement and differential settlement, building damage criteria. *Soil behaviour in shear; Peak, critical state and residual strengths; Drained and Undrained strength; state and material properties, dilation, choice of shear strength parameters for shallow foundation design; Stress paths and their value in decision making. * Laboratory testing of soils Standard tests, purposes and specification; Shear box, triaxial and oedometer tests; Summary: - Shear strength of soils in drained and undrained conditions; peak, critical state and residual soil strength; stress path sketching; elastic stress distribution in soil; soil compressibility and consolidation; geotechnical design of shallow foundations and associated laboratory tests such as triaxial and oedometer tests

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CE4025 - TRANSPORT PLANNING AND DESIGN

ECTS Credits: 6 (Year 3 Module)

Restrictions: This module can only be selected if all other civil engineering autumn semester modules are selected (CE4005, CE4015, CE4025, CE4045, CE4055)

School of Engineering

Rationale and Purpose of the Module: This module places transport in its wider historical and contemporary context as a major determinant of sustainable human settlement. It addresses current thinking and trends and introduces the main

methods of data collection and analysis, transport system planning, appraisal, design and management.

Syllabus: History and Contemporary Picture and Trends: Physical, social, political and economic contexts, sustainable transport and settlement, current policies and trends.
Data Collection and Analysis: Use of demographic data, survey design and implementation. Appraisal and Forecasting: Demand drivers, mode choice and behaviour, an overview of multi-modal macro and micro modelling, modelling uses and limitations, demand and capacity forecasting, impact assessment.
Road Design: Road construction details and geometric guidelines, road junction analysis.

MT4105 - QUALITY SYSTEMS
ECTS Credits: 6 (Year 3 Module)
School of Engineering

Rationale and Purpose of the Module: This course provides a concise introduction to quality management systems such as ISO 9001 and shows how these are integral to the success of Irish industry. Other management system including environment and health and safety are also introduced.

Syllabus: Introduction
What is quality
Quality Assurance Vs Quality Control. Interface between quality and other business functions
Inter-relationships between quality, reliability, price and delivery. Quality Management Systems (QMS)
Historical development of ISO 9000
Introduction to ISO 19011
An outline of the elements of ISO 9001 Quality documentation - the purpose of the quality manual, procedures and work instructions. Organising for quality -the importance of management commitment and leadership and the role of the quality function within the company. Control of vendors - purchasing criteria and the control of raw materials and service suppliers; vendor assessment. Auditing and registration - how to conduct audits, auditor criteria, how to apply for registration and what are the requirements. Product testing and ISO 9001
Introduction to ISO 14001 and OHSAS 18001

PT4005 - SUPPLY CHAIN DESIGN
ECTS Credits: 6 (Year 3 Module)
School of Engineering

Rationale and Purpose of the Module: Position supply-chain design in the context of its roots in operations management, and its relationship with other functional management. Put forward the Supply-Chain Operations Reference model (SCOR) as a framework for supply-chain architecture. Introduce foundational concepts for representing and thinking about how to optimise and continuously improves supply-chain operations.

Syllabus: CONTEXT: Operations and Supply Chain Strategy, integration and the SCOR framework structure and possible approach to implementation.
SOURCE: Forecasting, New Product Development, Project Management,
MAKE: Capacity Planning, Process Design and Analysis, Quality Management
DELIVER/RETURN: Independent Demand Inventory, Dependent Demand Inventory, Optimization/ Simulation Modelling and logistics.
PLAN: Quality Improvement Methods and Lean Enterprise, Technology and Integrated Supply Management, Global Supply Chain and Service Integration.

PT4015 - LEAN THINKING AND LEAN TOOLS
ECTS Credits: 6 (Year 3 Module)
School of Engineering

Rationale and Purpose of the Module: To introduce the main elements of the Lean process improvement framework, focusing on quantity control and human engagement, through lectures, readings and laboratory experience. To prepare students to engage in performance improvement projects during Coop.

Syllabus: Introduction to lean and continuous improvement philosophy in context of quantity control and its relationship with quality control and broad business processes such as new product development and supply-chain. Forms of waste and PDSA. Supply-chain context, supply chain reference model SCOR and performance criteria. Problem identification and 5S, as initiation for structured problem analysis and enquiry. Process mapping, focusing, critical questioning, and process improvement. Work standardisation, allowances, rating, and standard work. Work-flow, types of layout, consequences: material movement, Littles law, flow factor. Systematic Layout Planning, layout design and improvement. Inventory control, classical economic order quantity, safety stocks, batch size and consequences: Little¿s law, flow factor and variability effects. Push planning (MRP/CRP/MRPII). Setup time, setup time reduction programmes, SMED, flow factor, flexibility and commercial significance. Pull material flow systems eg kanban, drum-buffer- rope. Production line balancing and production flow smoothing, goal-chasing methods, and significance. Engagement of people, kaizen and process improvement teams, organisational conditions eg structure, culture and reward systems. Lean thinking, policy deployment and organisational cohesion.

PT4025 - SIMULATION MODELLING AND ANALYSIS

ECTS Credits: 6 (Year 3 Module)

School of Engineering

Rationale and Purpose of the Module: To provide students with knowledge on discrete event simulation modeling and its application to manufacturing, logistic and services systems. To provide students with modelling and software capabilities to apply simulation to manufacturing, logistic and services systems

Syllabus: Introduction to simulation Overview of simulation modelling, introduction to the basic concepts of discrete event simulation. The simulation process steps involved in carrying out a simulation project. Comparison of discrete event simulation with continuous simulation and system dynamics. Computer simulation packages Overview of available computer packages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to manufacturing, logistic and services systems using a generic simulation package. Provide an overview of available simulation software. Statistical aspects of simulation Input analysis, random number generation, output analysis, experimental design. Queuing Models Provide comparison of simulation with stochastic mathematical models through the introduction of basic queuing models. Systems Design Using simulation students will carry out systems (manufacturing, logistic and services systems) design assignments.

WT4301 – BUILDING AND CONSTRUCTION REGULATIONS 1

ECTS Credits: 6 (Year 3 Module)

School of Engineering

Rationale and Purpose of the Module: The overall aim of this module is to provide an introduction to health and safety principles and practices in building and construction.

Syllabus: Introduction: terminology / why manage safety? The Importance of Safety on a construction site Recognising hazards and the Safety culture Safety, Health and Welfare at Work Law in Ireland the 2005 Act The Safety Statement and Risk Assessment Overall View of Construction Regulations 2013 Impact on Work Construction Duty Holders SHWW compliance and regulatory bodies Accident theory/ near miss/ dangerous incident reporting and investigation. Manual Handling Underground Services Safety in excavation and confined spaces Working at heights Safety considerations when using equipment Noise induced hearing loss Chemicals and dangerous substances Emergency preparedness Risk assessment on construction sites with regards to SHWW Housekeeping Welfare on site Communication and Coordination Training - induction and on-going

Personal protective equipment - types, uses and limitations The ethics of Safety Management Behavioural aspect of safety management in construction.

WT4605 - PROCUREMENT AND CONTRACTING

ECTS Credits: 6 (Year 3 Module)

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide an understanding of the different forms of contract and their commercial implications, and provide project managers with an overview of the procurement and contracting processes as part of the overall project management process. The specific objectives are to provide learners with the knowledge of; The different types and forms of contract used in procuring services for projects.

To develop a strong understanding of the standard forms of construction contracts in use in the industry, both domestically and internationally and making specific reference to the work carried

out under the aegis of the various multilateral development banks Standard contract forms and how they are used in the various stages of the project lifecycle The procurement process and the perspectives of different parties Contract administration.

Syllabus: Contract building blocks, forms and essential elements of contracts, partnering and new developments forms, buyer-seller relationship. Invalidity factors, agreements, conditions and warranty, liquidated damages, performance bonds and terms of payments. Contract administration, claims and disputes, legal procedures, conciliation & arbitration. Managing conflict and negotiating procedures. Contract closure, compliance, maintenance periods, commissioning, payment structures and final accounts. Areas of dispute, dispute resolution, dispute boards, adjudication, alternative dispute resolution

Prerequisites: WT4804, WT4704

WT4705 - BUILDING PRODUCTION

ECTS Credits: 6 (Year 3 Module)

School of Engineering

Rationale and Purpose of the Module: To introduce the student to the science and art of New Product Development within the construction domain. It links the manufacturing and construction skills learnt in earlier modules with the design process and these are brought together by means of a project. The project is intended to take the student through the basic design process into requirements engineering, market analysis, materials, manufacturing processes and the production of an initial business plan.

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD;

The deliverables of processes of design; NPD Failure Reasons, Rationale for Concurrent Engineering.

NPD Project Planning- Minimising NPD Lead Time, NPD Resources, Teams.

NPD Requirements Definition - Specifications, QFD, Focus Groups, Functional Analysis. Defining

Customer Requirements, House of Quality (HOQ), Voice of the Customer (VOC), Product, Process Planning -Parts Deployment & Production Planning.

Product Concept Evolution- Idea & Concept Generation, Creativity, Brainstorming - Morphological Analysis, Synectics, Analogy. Concept Evaluation - Ranking Methods, Concept Assessment Techniques, AHP. -Pughs Concept Selector, Convergence and Divergence.

Standardisation & Modularity- Features of Good Design, Parts & Processes Commonality.The cost of complexity and variation. Variety Reduction. Design for Assembly (DFA). Legal Aspects of NPD - Laws on Product Liability and EU PL Directive, CE Mark.- Safety Evaluation, Prevention of Defective Products. Intellectual Property - Patents, Application Process and requirements. -Copyright, trademarks and design registration.

ME4226 - MECHANICS OF SOLIDS 2

ECTS Credits: 6 (Year 3 Module)

Basic Knowledge of Mechanics of Materials, stress, strain, Young's modulus, Poisson's ratios, Mohr's stress circle, torsion required

School of Engineering

Rationale and Purpose of the Module: To understand and analyse and measure the state of strain at a point in a 2D strain field. To analyse stresses and deformation in circular plates under symmetrical loading. To be able to determine yielding under multiaxial loading. To be able to predict the maximum deflection of a beam subjected to simple and complex loading in a plane. To predict the buckling load and maximum stress in a strut. To understand the factors influencing fatigue life and be able to predict the life of simple engineering components. To understand the basics of LEFM. To analyse the stresses in beams of unsymmetrical section.

Syllabus: Infinitesimal strain at a point in a 2D stress field and Mohr's strain circle. Selection of strain gauges for measurement on metals. Thin circular plates. Criteria of failure for isotropic homogeneous materials (Rankine, Tresca and Von Mises). Deflection of beams. Buckling of struts (Euler and Rankine-Gordon). LEFM. Fatigue. Unsymmetrical bending.

Prerequisites: ME4213

Engineering Year 4 Modules

CE4007 - WATER MANAGEMENT SYSTEMS

ECTS Credits: 6 (Year 4 Module)

Limited places available: 5

School of Engineering

Rationale and Purpose of the Module: The module covers the design and modelling of wastewater and stormwater collection systems, and water distribution systems in the context of sustainable development.

Syllabus: Context and principles of water management, structural and hydraulic components of water distribution systems (reservoirs, pump stations, surge tanks) and water / wastewater collection systems (pipelines, manholes, combined sewer overflows, siphons, pumping stations, attenuation tanks); pipeline construction techniques and their application for specific site and ground conditions; development and use of numerical analysis tools for the design of hydraulic systems; analysis and design of water storage and distribution systems, including flow demand, storage requirements, flow pressure and control; analysis and design of surface / wastewater collection systems, including assessment of hydraulic loads, sustainable urban drainage systems, network capacity, flow velocity, sediment transport, design & application of hydraulic structures; hydraulic design of treatment plants; hydraulic profiles; long term economic and sustainable design and operation of hydraulic systems.

DM4017 - SIMULATION MODELLING AND ANALYSIS

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: To provide students with knowledge on discrete event simulation modeling and its application to manufacturing, logistic and services systems. To provide students with modelling and software capabilities to apply simulation to manufacturing, logistic and services systems.

Syllabus: Introduction to simulation Overview of simulation modelling, introduction to the basic concepts of discrete event simulation. The simulation process steps involved in carrying out a simulation project. Comparison of discrete event simulation with continuous simulation and system dynamics. Computer simulation packages ¿verview of available computer ackages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to manufacturing, logistic and services systems using a generic simulation package. Provide an overview of available simulation software.

Statistical aspects of simulation Input analysis, random number generation, output analysis, experimental design.
Queuing Models Provide comparison of simulation with stochastic mathematical models through the introduction of basic queuing models. Systems Design
Using simulation students will carry out systems (manufacturing, logistic and services systems) design assignments.

DM4027 - MEASUREMENT AND QUALITY SYSTEMS (ENG)
ECTS Credits: 6 (Year 4 Module)
School of Engineering

Rationale and Purpose of the Module: Appreciate the importance of measurement standards and systems.
Apply sound principles to a variety of measurement requirements.
Understand and apply scientific principles to the analysis of manufacturing data.
Use the results of the analysis to identify areas that need improvement.

Syllabus: ISO9000 and its variants, requirements for a quality system, calibration needs and systems. Basis of measurement and interchangeability, limits and fits, BS4500. Line and length standards, optical flats, interferometry, errors in measurement. Measuring instruments and techniques: Length, angle, flatness, straightness, displacement. Measurement of: straightness, machine tool alignment, flatness, surface texture. Process Variability: capability tests, indices, R & R studies, Central Limit Theorem. Charting techniques: X/R and X/S, average run length, Cusum, np, c, p and u charts. Acceptance sampling: OC curves, design of single, double and sequential sampling plans, variables sampling, continuous sampling. International standards e.g. MIL-STD 105D, MIL-STD-414.
Statistical Process Control, Statistical Process Control for Variable Data, Statistical Process Control for Attribute Data, Short Run SPC, Minor Project.

ME6008 - MICROFLUIDS
ECTS Credits: 6 (Year 4 Module)
School of Engineering

Rationale and Purpose of the Module: To provide the students with an understanding of the main theoretical concepts, measurement and manufacturing methodologies for microfluidic devices.

Syllabus: Relevance of microfluidics in Lab-on-a-Chip, BioMEMs and Process Intensification Scale effects on mass, momentum and thermal transport Poiseuille flow in rectangular channels, developing microflows, prediction using hydraulic resistance, slip effects in gaseous flows (1st and Deissler 2nd Order), Tangential Accomodation Coefficients Measurement Techniques (Pressure, Flow, Velocity, Mass Transport, Temperature) Introduction to Microfabrication Techniques for microfluidic devices (DRIE, Stereolithography, Embossing etc.)

ME4031 - AEROSPACE STRUCTURES
ECTS Credits: 6 (Year 4 Module)
Students cannot take ME4037 alongside this module
School of Engineering

Rationale and Purpose of the Module: This module builds on the Mechanics of Solids 2 (ME4226) module by providing students with further skills in the analysis of stress, strain and deformation of aerospace structures. The effect of complex combined loading scenarios on various types of aerospace structures are studied and compared using combination of analytical and experimental methods.

Syllabus: Theory of elasticity; Airy stress function. Energy methods for structural analysis. Shear and torsion of open and closed thin walled sections, single and multicell sections. Bending and twisting of thin plates. stress analysis and failure criteria.
Stress analysis of aerospace components; fuselages, wings. Design of spacecraft structures, Selection of materials, Composite spacespace

structure manufacturing and validation, Trusses and truss spaceframes. Local buckling of thin- walled tubes. Application of proprietary structural analysis software packages and the application of Finite Element Analysis to aircraft structures. Experiments on tapered spars, c-and z-section beams.
Prerequisites: ME4226

ME4037 - ADVANCED MECHANICS OF SOLIDS
ECTS Credits: 6 (Year 4 Module)
Students cannot take ME4031 alongside this module
School of Engineering

Rationale and Purpose of the Module: To analyse stresses and strains in 2D and 3D in an elastic body subjected to various loading conditions. To analyse stresses and strains in uniaxial, biaxial and axisymmetric stress fields for elastomers. To understand how to apply stress functions to problems in bending, contact stress and pure shear. To use numerical techniques combined with experimental analysis for the solution of complex problems.

Syllabus: Stress at a point in 3D. Strain at a point in 3D (including finite strain). Theory of 3D strain rosettes and Morie grids. Constitutive relations for finite strain analysis of elastomers. Theory of elasticity: Equilibrium and compatibility, stress functions (various applications). Hertzian contact theory. Photoelasticity. Holography.
Curved bars and struts.

ME4167 - MEDICAL DEVICE EVALUATION
ECTS Credits: 6 (Year 4 Module)
School of Engineering
Rationale and Purpose of the Module: This module is designed to introduce students to the Medical Device Evaluation process that is required prior to clinically trialling a medical device. It provides detail on the regulations that govern medical device evaluation, the preclinical models that can be used to evaluate a medical device prior to clinical evaluation, and how to statistically analyse and visualise the data generated by preclinical testing of medical devices.

Syllabus: The syllabus will cover: An introduction to medical device evaluation and the relevant regulations (including risk management, design controls and biological evaluation). 2D cell culture and in vitro testing (including aseptic technique, culturing of cells in vitro, and in vitro cell-based assays for medical device evaluation). Statistical analysis and data visualisation (including descriptive statistics, inferential statistics, and data visualisation). Ex vivo tissue testing and ex vivo tissue studies (including human tissue overview, human tissue testing, and ex vivo testing of medical devices). Animal models and in vivo studies (including an overview of animal models, in vivo studies for medical device evaluation, and histological assessment of explanted tissue). Alternatives to animal models (including 3D cell models, organoid models, and organ-on-a-chip models).

ME4307 - BIOMATERIALS 1
ECTS Credits: 6 (Year 4 Module)
School of Engineering

Rationale and Purpose of the Module: Review understanding of biological systems; To gain appreciation for soft tissue replacement materials in current use; To enable the student to understand materials selection and design requirements for soft tissue replacement applications.
Syllabus: Materials for soft tissue replacement. Survey of applications, haemocompatible materials, materials for vascular grafts, stents and heart valves, artificial skin, tendon ligament. Materials for cosmetic implants. Opthalmic materials. Active implanatable devices, extracorporeal artificial organs. Dressings, sutures, drug delivery materials/systems.

ME4417 - BOUNDARY LAYER THEORY
ECTS Credits: 6 (Year 4 Module)
School of Engineering

Rationale and Purpose of the Module: To advance the knowledge of the students of fluid flow, aerodynamics and convective heat transfer

Syllabus: The Derivation of the Three-Dimensional Viscous, Steady, Compressible Equations of the Conservation of Mass, Momentum and Energy.
The Distinction between Differential and Integral Solutions.
Differential Solutions for Simple Pipe Flow with Heat Transfer and Couette Flow. The Von-Karmen Integral Solution of Flat Plate Flow with Heat Transfer.
Dimensional Analysis for Free and Forced Convection: the Non-dimensionalised Differential Equations.
Shear Stress Drag and the Reynolds Colburn Analogy.
Theories of Turbulence: The Prandtl - Mixing Layer Theory, the K-E Model.
The Effect of Turbulence on Drag and Heat Transfer: The Elements of a Turbulent Boundary Layer.
Prerequisites: ME4412

ME4818 - MECHANICAL DESIGN
ECTS Credits: 6 (Year 4 Module)
School of Engineering

Rationale and Purpose of the Module: To expose the student to the practical application of design, materials, mechanics and strength of materials theory. The work will focus on the appropriate use of Standards, Charts and Design Guides illustrating the oft times empirical nature of applied engineering tasks. Underpinning each topic will be constant reference to the evolution of the practices and their relationship to current theory. In particular, there will be constant reference to the life and reliability to be expected from solutions.

Syllabus: [Integration of machine elements into design.] Overview of common engineering materials and their functional properties. Review of steels and heat treatment processes relevant to transmission design. Practical aspects of stress analysis as used in industrial applications. Stability of design elements. Aspects of component life, cost and reliability.
Introduction to bearings, types and selection criteria. Rolling Contact Bearing selection using catalogue data. Shaft design as an example of a simple component. Shaft couplings and keys. Flat, V, Wedge and Polyvee belts and chain drives. Review of the history of gear design showing the relationship to fatigue theory. Advantages of helical and spiral bevel gears in relation to noise, wear and strength. Clutches and brakes - selection considerations. Electric motors - types and control options. Starters and protection devices.
[Design for Fatigue Life] Use of fatigue data, load and environment factors in design and selection. [Pressure vessel design.] Use of standards. Materials and life considerations. Corrosion protection. Safety and the work environment. Testing and certification. [Hydrostatic Transmission Systems.] Design of circuits for simple tasks. Linear and rotary actuation devices. Pump and motor types and selection, Circuit safety and calculation considerations. Control and speed circuits and devices.

ME6181 - SPACE SYSTEMS DESIGN
ECTS Credits: 6 (Year 4 Module)
(Lab-Based Module)
School of Engineering

Rationale and Purpose of the Module: The space systems design module is being set up to introduce spacecraft engineering design from a system level perspective. The module is to be offered to final year M.E. and M.Sc. students and it aims to introduce students to the topic of spacecraft flight and spacecraft subsystems and enable them to develop an understanding of the basic analytical techniques and the key concepts in this area. On completion this course students will have a basic understanding of spacecraft applications, mechanics of orbits, basics of spacecraft propulsion, thermal design, power systems, communications systems, attitude control systems and the influence of the space environment on spacecraft design. The

fundamental knowledge provided in this course will involve: (i) knowledge of the space environment and its effects on spacecraft systems; (ii) determination of space missions requirements for both spacecraft systems and payloads; (iii) knowledge of orbital mechanics and space mission design; (iv) understanding of spacecraft systems design and analysis. **Syllabus:** The syllabus incorporates the most relevant elements for the design of spacecraft systems as • Launch and extra atmospheric environments (S1): sources of mechanical excitation during spacecraft launch, and during space operations • Keplerian Orbits (S2): orbits, orbit manoeuvre and orbit design • Spacecraft Systems and Payloads (S3): systems approach to spacecraft design, including mission and payloads requirements, key design drivers and mission objectives • Attitude Determination and Control (S4): laws of dynamics applicable to spacecraft and different types of spacecraft attitude stabilisation systems • Thermal Control (S5): thermal control in space including passive and active systems, thermal mathematical models and interfaces with the thermal control subsystem. • Propulsion (S6): key types of spacecraft propulsion systems and propulsion system analysis • Electrical Power Raising and Supply (S7): spacecraft power subsystem, battery and solar array cells and sizing of a power subsystem • Telecommunications (S8): spacecraft design drivers for telecommunications subsystems

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PT4007 - PLAN WITH SUPPLY CHAINS

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: This module is part of a stream.

The centrality of planning activity is established in the context of the Supply-Chain Operations Reference Model (SCOR). Planning incorporates anticipation ¿ represented here by Forecasting ¿ and making optimal decisions about capacity of supply, storage, production, delivery and enabling processes, and about how to integrate and deploy this capacity optimally in terms of performance and cost trade- offs within the confines of limited resources.

Syllabus: Demand and Order Management: Role of demand management in supply chain planning, Forecasting, Fundamentals of sales and operational planning. Capacity Planning and Utilization: Role of capacity planning, Capacity planning techniques, Scheduling capacity and materials. Production and Inventory Management: Master Production Scheduling (MPS) techniques, Bill of material structuring for MPS, Production Activity Control (PAC), Inventory management concepts, Inventory related costs, Multi-item management. Distribution Requirements Planning: Distribution Requirements Planning (DRP) in the supply chain, Available to Promise, Allocated Available to Promise. Planning in Source, Deliver and Product Returns: Source requirements, Deliver requirements, Product return requirements, Reverse logistics.

Planning Systems: Enterprise Resource Planning (ERP), Performance measures for system effectiveness, Material Requirements Planning (MRP) techniques, Advanced Planning and Optimisation tools and techniques, Solving planning problems with Linear

Programming: Planning problems requiring LP, Example LP models, Modelling and solving LP models in a spreadsheet, The purpose of and approaches to sensitivity analysis of LP Models.

PT4037 - INNOVATION AND TECHNOLOGY MANAGEMENT

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: To provide students with an understanding of the role of technology and innovation within industrial organisations and with the ability to manage technology as a resource within products, services and processes.

Syllabus: Business opportunities and strategies, product and technology strategies, planning, support and finance for technology based businesses, product lifecycles costs, cost estimating.

Innovation Management, types of innovation, the innovation process, successful innovation and innovators, creating the innovative organisation, new technology-based firms. Markets for new products and technologies, identifying and interpreting customer needs, translating customer needs into product specifications. New product and service ideas, forecasting techniques, technology trajectories, product concept generation, selection and testing, product planning, product platforms, product specifications. Sources of technology, technology transfer, strategic alliances, the management of patents and intellectual property, Research & Development management, Success Factors, Product Development Process, the use of Prototypes, Product Development Organisation, product commercialisation and launch. Managing technical projects, project definition, planning and execution.

PT4427 - DESIGN FOR MANUFACTURE

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: To introduce the student to the science and art of New Product Development. It links the manufacturing and construction skills learnt in earlier modules with the design process and these are brought together by means of a project. The project is intended to take the student through the basic design process into requirements engineering, market analysis, materials, manufacturing processes and the production of an initial business plan.

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD;

The deliverables of processes of design; NPD Failure Reasons, Rationale for Concurrent Engineering.

NPD Project Planning- Minimising NPD Lead Time, NPD Resources, Teams. NPD Requirements Definition - Specifications, QFD, Focus Groups, Functional Analysis. Defining customer Requirements, House of Quality (HOQ), Voice of the Customer (VOC), Product, Process

Planning -Parts Deployment & Production Planning.

Product Concept Evolution- Idea & Concept Generation, Creativity, Brainstorming - Morphological Analysis, Synectics, Analogy. Concept Evaluation - Ranking Methods, Concept Assessment Techniques, AHP. -Pughs Concept Selector, Convergence and Divergence.

Standardisation & Modularity- Features of Good Design, Parts & Processes Commonality.The cost of complexity and variation. Variety Reduction. Design for Assembly (DFA). Legal Aspects of NPD - Laws on Product Liability and EU PL Directive, CE Mark.- Safety Evaluation, Prevention of Defective Products.

Intellectual Property - Patents, Application Process and requirements. Copyright, trademarks and design registration.

PT4617 - RELIABILITY TECHNOLOGY

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: To give students an understanding of the principles of reliability evaluation and the influence on maintenance strategies, costs and replacement decisions.

To equip students with abilities to perform environmental audits on products and processes. To present environmental impact assessment and ecological foot-printing of products and processes used in the critical realisation of current unsustainable engineering trends.

Syllabus: Fundamentals: concepts and formulae, hazard rate calculations, use of redundancy and considerations of implications on costs of purchase, operation and maintenance, system reliability using block diagram reduction and state transition analysis techniques.

Reliability estimation: from observed failure characteristics, use of Weibull distribution, Weibull Hazard Plotting for censored data, Markov analysis including systems subject to repair. System availability and factors affecting this. Prediction of repair times. Part failure rate analysis, data sources, failure modes, effects and criticality analysis, influence of environment and operational modes,

identification of areas for effort to improve reliability and techniques for doing so, load- strength relationships and [application of simulation] to this. Case study. Acceptance testing for reliability, confidence levels. Environmental testing: methods and instrumentation, effects of heat, humidity, corrosion, mechanical hazards eg shock loading and vibration, consideration of packaging and mounting, burn-in procedures. Fault-tree analysis and cost-benefit analysis. Safety. Replacement decision-making examples of deterministic and probabilistic analyses including [modelling and simulation], use of discounted cash-flow techniques, MAPI analysis, influence of depreciation and tax. Optimisation of the lifetime of products shifting towards a cradle-to-cradle concept, combined with a Product Lifecycle Analysis (PLCA). Packaging design and analysis. Redesign and reengineering to minimise parts and fasteners. Transport, distribution and reverse logistics. Renewable materials and energy, repair, reuse and recycling.

Materials selection for sustainability.

WT4117 - STRUCTURAL DESIGN

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a basic understanding of structures and the design of principal structural elements.

Syllabus: Basic structural concepts and material properties, design loads, limit state design principles, beam design, axially loaded column design, column base & splice details, design of tension members and compression members, design of simple connections, trusses and bracing, floor design, introduction to structural detailing; bearing pressures, design of shallow foundations, introduction to lateral stability.

Prerequisites: WT4503

WT4507 - FORENSIC ENGINEERING AND ETHICS

ECTS Credits: 6 (Year 4 Module)

School of Engineering

Rationale and Purpose of the Module: This module introduces the important subject of ethics through the study of engineering failures. Well-documented case studies, project work and invited speakers form an intrinsic part of achieving the following key objectives:

To promote ethical behaviour throughout the studentsÆ personal, university and professional lives.

To demonstrate the value of learning from engineering failures. * To emphasise the scientific method in engineering practice. * To produce good citizens. * To emphasise the importance of effective communication.

Syllabus: Reasons for failures in engineering; Modes of failure; Risk; Failure case histories in concrete, steel, masonry, foundations and timber etc; Common pitfalls, FeldÆs ten basic rules; Nonstructural failures; Learning from failures; Forensic engineering practice; Conducting a forensic engineering investigation;

Writing a forensic engineering report; Ethics and Responsibilities, Standard of Care; Rules of evidence, Depositions, Arbitration.

These topics will be addressed through PBL exercises involving individual and/or team challenges. The module assessment is by 60% CA work and 40% end of semester examination. Examples of CA work include class debates (e.g. cases involving ethical dilemmas faced by engineers such as Citicorp building N.Y.), individual online quizzes on ethics, individual online quizzes on forensic engineering, team based forensic engineering projects requiring presentations and report writing. Cross faculty collaboration on projects involving law and architecture is also encouraged on this module.

CE6001 - WIND, OCEAN & HYDRO ENERGY

ECTS Credits: 6 (Year 4 Module)

Limited Spaces available

School of Engineering

Rationale and Purpose of the Module: This module introduces students to national and EU policy, resource assessment, conversion principles, electricity generation potential associated with renewable energy generated from wind, ocean & hydro resources, stability issues with electrical grids. This will equip students with the knowledge and analytical skills necessary to advise on their appropriate use at specific sites.

Syllabus:

Wind Energy Onshore & Offshore: Market status and current trends; Site and Resource Assessment; Supporting Structures; Aerodynamic and Power Conversion Principles; Power Predictions with Statistical Analysis; Selecting Turbine Classification; Economic Assessment with review of National and EU policy; Storage Mechanisms Hydro-Energy: Market Status and Current Trends; Catchment Areas; Dams;

Weirs; Hydrodynamic and Power Conversion Principles; Environmental Impact; Layout of Hydro Power Systems; Power Output; Economic Assessment; Peak Load Management Ocean Energy: Potential Market and Case for Irish Ocean Energy; Review of Emerging Technologies for Wave & Tidal Energy conversion; Power Conversion Principles

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ME4517 - ENERGY MANAGEMENT

ECTS Credits: 6 (Year 4 Module)

Knowledge of the gas turbine cycle and steam cycle is required

School of Engineering

Rationale and Purpose of the Module: To provide an understanding of; the requirements for, and the methods of, energy management as applied to a variety of engineering systems.

Syllabus: Fossil fuel reserves and rates of consumption. Energy situation in Ireland, trends and issues, present and future. Energy and the environment. Energy tariffs and their significance in industry. Energy conservation technologies for industry. Energy Management Systems. Combined Heat and Power. Renewable Energy Sources. Modelling thermal equipment. Heat exchanger effectiveness and number of transfer units. Advanced steam and gas turbine cycles.

Prerequisites: ME4526, ME4516

ME6091 - AEROSPACE METALLIC MATERIALS

ECTS Credits: 6 (Year 4/5 Module)

Basic Materials Science and strength of materials required

School of Engineering

Rationale and Purpose of the Module: Module introduces Aeronautical Engineering and Advanced Engineering Materials students to the metallic materials and processing technologies used in aircraft structures.

Syllabus: The chronological development of materials for aircraft structural applications. Quantitative materials selection to determine materials performance indices for selected aircraft components - illustrated by selecting optimised material for fuselage, wing and undercarriage. Properties and processing of metallic monolithic and composite materials. Review and advanced examination of the concepts of stiffness, strength, fracture toughness, stress corrosion, general corrosion, fatigue and damage tolerance. Demonstration of how these properties affect ab initio structural performance and in service degradation. Physical metallurgy and structure property relationships of aluminium alloys, titanium alloys, magnesium alloys, alloy steels metal matrix composites. Corrosion characteristics. Development of new advanced metallic materials and processes to counter the competition from polymer composites.

Engineering Year 5 Modules

ME6052 - FRACTURE MECHANICS

ECTS Credits: 6 (Year 5 Module)

Architecture and Product Design

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

School of Architecture and Product Design Year 1 Modules

AR4001 - DESIGN STUDIO 1A

ECTS Credits: 15 (Year 1 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture Portfolio required

School of Architecture and Product Design

Rationale and Purpose of the Module: The aim of First year Design Studio is to enable the student to become an active participant in the architectural design process. The field of architecture is broad and the methodologies used to work within it varied. In addition, architecture interacts closely with a number of related disciplines.

First year Design Studio exposes the student to the types of thinking and acting inherent in this process with the objective of helping the student become conversant with the process and capable of developing initial architectural projects.

Syllabus: Design Studio is the backbone of study in Architecture. Study is organised around design problems or projects, a number of which are given each term.

By working through the project, the student will become exposed to the architectural design process, a new and complex process for most first year students. Each project introduces a different aspect of the architectural design process in order to help the student develop a range of methods of working. Each project also introduces a new programmatic theme so that students understand and become conversant with the many fields of operation of an architect. Themes include space and light explorations through model making, understanding the process of abstraction and transformation through model making/two dimensional work, building full scale structures in timber to explore architectural concepts such as scale, framing, section and thresholds, developing observational skills through sketching on site, learning how to make a site plan by developing a pattern of occupation on an open site, learning how to develop a building design grounded in this context.

Studio work is organised so that close contact is maintained with the student. Work is analysed and discussed with the student on an individual basis and within the group. The student is taught to recognise the design process and to value and catalogue their own work. As the year progresses the student is encouraged to become increasingly responsible for organising and developing their own work process.

The studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.

AR4011 - GRAVITY AND REACTION 1

ECTS Credits: 3

(Year 1 Module) (Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design and portfolio background required

Restrictions: integrated with AR4041 and AR4051

School of Architecture and Product Design

Rationale and Purpose of the Module: Give students the understanding of a number of useful structural concepts using experiment, intuition and formal learning. Give students a strong conceptual and formal grasp of these concepts, that are applicable to actual conditions.

Syllabus: Lectures, Experiments in the following concepts: One Equation: Gravity + Reaction = Equilibrium (stable, unstable, neutral).

Co-Ordinate Systems What does 3D space mean? What is gravity? Einstein versus Newton: Effects of gravity have been described yet what is it? How does it act over distance? Gravity waves never detected. Friction

If force causes a change in velocity why is it so hard to push start a heavy timber crate? Why cannot a small child push start the crate? Components of a Vector

A force can act on a body without changing its speed of motion; only its direction of motion; planetary motion. Tension & Compression , Buckling of Compression Members, Moments Equilibrium: How does an even see-saw balance? Neutral / unstable equilibrium. How does an uneven see-saw balance. The gravity forces are different. Components of a force, Internal Forces, Beams: Members that Bend, Stiffness, Materials, Connections

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AR4021 - REPRESENTATION / DRAWING 1

ECTS Credits: 3 (Year 1 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design and portfolio background required

Restrictions: integrated with AR4001 – same restrictions apply

School of Architecture and Product Design

Rationale and Purpose of the Module: To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course is composed of two different types of drawing exercises:

Studio based exercises with weekly changing subjects introducing key aspects of architectural vocabulary (light and space, site, human scale, skin and comfort, flows and organisation, vision and architecture). Short introducing lectures are followed by a drawing or sketching exercise, and, in the next step by a model making exercise, where the drawings from the exercise have to be interpreted and transformed into the 3rd dimension. Contents of both exercises as well as the chosen format, materials and techniques are directly related to the particular subject. As subject matter, each session will be organized around a specific theme from art, photography, film, dance, architecture

Exercises in architectural drawing in a conventional sense, line drawings of floor plans, sections and details in pencil, are introduced within an extensive lecture, then elaborated by the students as far as possible self-dependently and later on reviewed.

In both parts of the course curriculum hand drawing with pencil is emphasized in order to develop within the students a sensitivity to the medium. Exercises are on opaque white paper so as to prevent tracing and use of construction aids.

AR4031 - HISTORY AND THEORY OF ARCHITECTURE 1

ECTS Credits: 3 (Year 1 Module)

(Studio-Based Module)

Limited places available: 2

(Lecture Course)

School of Architecture and Product Design

Rationale and Purpose of the Module: The first year program in History-Theory aims to expand studentsÆ horizons of knowledge about architecture while teaching foundational skills in reading and writing in the discipline. Even though students at the School of Architecture are expected to be highly literate and articulate, entering into a new fieldùsuch asarchitectureùis a difficult intellectual transition to make. Students will need to develop specific cognitive skills to address the new territories they will have to map. The first year program sets out to help students attain a basic literacy in the discipline while introducing a selection of the monuments of modern architecture together with contemporary ways of thinking about the field.

Syllabus: The theme for the fall workshop is Site. Objectifying and describing a site is typically difficult for beginning, or even advanced students, and yet is a skill all architects must master. Site is the precondition for construction and the link between architecture and the world. With forms of human habitation rapidly changing due to urbanization, site becomes a more important consideration every day. Seminars will address Fields, Territories, Surveys, Flows, and Contexts, surveying both historical and contemporary material to challenge students. As an introduction to architecture as an expanded field, students will encounter disciplines such as politics, geology, philosophy, infrastructural engineering, land art, archaeology, and landscape architecture. Buildings will illustrate responses to the topics and students will encounter a selection of the most significant works in modern and contemporary architecture.

AR4041 - ASSEMBLY AND TECHNIQUES 1

ECTS Credits: 3 (Year 1 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

Restrictions: integrated with AR4011 and AR4051

School of Architecture and Product Design

Rationale and Purpose of the Module: Introduction to Principles of Construction. Introduction to Construction Industry

Syllabus: This course will introduce basic constructional principles through the detailed study of elements of simpler constructional technology. This technology is considered from the point of view of design intent, logic of assembly and the quality of the resulting climate/environment. The course will further challenge the students to analyse the built environment they are familiar with under these themes. The suitability of various forms of construction to different design ambitions will be considered with particular emphasis put on developing an understanding of the size and dimensions of various constructional systems. The course is intended as a foundation course in itself as well as anticipating the information required in the design studio. The course is seminar based with an individual student research component.

AR4051 ENVIRONMENTAL SYSTEMS AND FORCES 1

ECTS Credits: 3 (Year 1 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background required

Restrictions: integrated with AR4011 and AR4041

School of Architecture and Product Design

Rationale and Purpose of the Module: Basic understanding of physical backgrounds and interconnections for a sustainable development

Syllabus: Sustainable development is a base for the future of human society on our planet. Architects as the designer for the built environment have a key position in this approach. Therefore a basic understanding of the physical backgrounds and interconnections is necessary. This lecture content spans from global to local and micro climate, to energy and itÆs different forms and sources towards materials and their properties. Parallel and interconnected to the teaching of design basics like space, light, boundaries students will learn the

physical backgrounds and properties by handling and personal experiences

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School of Architecture and Product Design Year 2 Modules

AR4013 - GRAVITY AND REACTION 3
ECTS Credits: 3 (Year 2 Module)
(Studio-Based Module)
Limited places available: 2
Restrictions: Architecture/design background and portfolio required
Restrictions: integrated with AR4043 and AR4053
School of Architecture and Product Design

Rationale and Purpose of the Module: Give students an understanding of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.

Syllabus: Continued Introduction to structural concepts. Topics covered will be portal frames, crane structure; RC beam design; timber truss design in qualitative process; shells, membranes. Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulam; steel; models to describe failure modes in structures. Students will research:
(a)* Materials in the studio and in a site context.
(b)* Materials used in structural design and their relevant components
(c) Failure modes in slab, trusses, beams, shells and membranes.
Prerequisites: AR4012

AR4023 - REPRESENTATION / DRAWING 3
ECTS Credits: 3 (Year 2 Module)
(Studio-Based Module)
Limited places available: 2
Restrictions: Architecture/design background and portfolio required
Restrictions: integrated with AR4073
School of Architecture and Product Design

Rationale and Purpose of the Module: In this module students hone skills in drawing through practising and form an understanding through application.

Syllabus: To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course consists of three different types of drawing exercises:
Surveying using the sketchbook, pencil and the body to observe and record buildings, proportions, scale, and distances of objects. Surveying using careful notation of dimensions through careful observation, and detailed measuring using a tape measure and triangulation. Drawing, with pencil, the results of the survey carefully bringing all information to the same level of detail and consistency on a well organised composed drawn document.
Prerequisites: AR4022

AR4033 - HISTORY AND THEORY OF ARCHITECTURE 3
ECTS Credits: 3 (Year 2 Module)
(Studio-Based Module)
Limited places available: 2
(Lecture Course)
School of Architecture and Product Design

Rationale and Purpose of the Module: The second-year program in Architectural Research provides students with a comprehensive survey of the history of architecture and urbanism. Students will continue to hone the specific cognitive skills required to address the field, deepening their knowledge of the local and global built domain while reading, writing, and researching architecture. The goal is to provide students with a basic knowledge and understanding of architecture and urban design in the period between circa 1851 and 1980. In addition, the course is designed to teach students how to critically analyse and evaluate built projects from a variety of perspectives, and how to

communicate these ideas in spoken and written form.

Syllabus: The first part of the course deals with ways of looking at the history of land and society; people, time, place (methodological with material from the Mediterranean, Ireland and Limerick). It will include several Case Studies The second part of the course is a contemporary theoretical survey of key theoretical aspects of modern architecture that exposes students to the monuments of the modern movement. Prerequisites: AR4032

AR4043 - ASSEMBLY AND TECHNIQUES 3

ECTS Credits: 3 (Year 2 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

Restrictions: integrated with AR4013 and AR4053

School of Architecture and Product Design

Rationale and Purpose of the Module: The aims of this class are: 1. to explain clearly and simply the basic principles of construction. 2. to show how much architectural expression depends on its constructional composition. Special attention will be paid to constructional aspects which imbue meaning and in this aspect it differs from the albeit relevant but exclusively technology-focused literature. 3. to introduce students to the importance of representing clear, legible and organised ideas to others in the construction industry.

Syllabus: Principles of assembly of buildings will be studied beginning through a raw material and a particular building typology. The focus will be on concrete, timber and steel construction. Practical reflections will be presented next to theoretical ones. Sober detail drawings will be introduced alongside thoughtful reflections. Basic construction concepts will be presented next to specific descriptions of construction processes. DRAWING EXERCISE: Each exercise will involve disseminating the required information the previous week. A short introduction will precede each exercise. LECTURE COURSE: A weekly lecture as well as visiting guest tutors will introduce students to properties of materials, covering descriptions of manufacturing methods, assembly and product ranges of the most important modern building materials. DIARY OF A BUILDING: Students will be asked to keep a diary of progress on each site that will involve sketches, notes and photographs. Each group will be asked to present their findings to the class at the end of the year. CASE STUDY: A building precedent will be presented to each student under the headings of concept, process and system.

Prerequisites: AR4042

AR4053 - ENVIRONMENTAL SYSTEMS AND FORCES 3

ECTS Credits: 3 (Year 2 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design and portfolio background required

Restrictions: integrated with AR4013 and AR4043

School of Architecture and Product Design

Rationale and Purpose of the Module: Advanced understanding of physical backgrounds and interconnections for sustainable development, and the integration of environmental principles into architectural works. Emphasis will be placed on the study of material properties. Particular attention will be paid to integration of environmental principles into design studio work. Specific material properties will be studied, and modelled.

Syllabus: Sustainable development is a base for the future of human society on our planet. Architects as the designer for the built environment have a key position in this approach. Lectures on details of Environmental system and forces such as integrated design of case studies process integration acoustical, visual and thermal comfort building physical basics heat losses and energy balance Research project on the modern building in respect of environmental systems Realisation of group project of Autumn Semester, Yr 2 as physical manifestations daylight model of studio space solar

simulator weather station indoor comfort station waste sorting system.
Prerequisites: AR4052

AR4073 - DESIGN STUDIO 2A
ECTS Credits: 15 (Year 2 Module)
(Studio-Based Module)
Limited places available: 2
Restrictions: Architecture Portfolio required
School of Architecture and Product Design

Rationale and Purpose of the Module: Phase I Using mapping as a vehicle for speculative architectural analysis, students will map one defined aspect of a particular place as ground, infrastructure, climate and occupation of space. Through mapping, students will confront their first analysis with more specific information: climate, ground, geology, built structures, growing structures, water treatment and flows, infrastructural networks, historic traces, land use and occupation of space. It is about identification of specifics through drawing, registering, measuring, timing, investigating; observe on site at several occasions and document, explain conditions, situations, make drawings, diagrams and sketches to explain conditions
Phase II Explore settings for physical activity and for the interconnection that happens between spectator and sport and between land and the body. Cultural and technical characteristics of sport must be integrated into the land in a way, which will change it consciously. Students first make a first landscape urban proposition (MODEL) plus make a set of drawings showing dimensional sizes for activities include heights PLANS,
SECTIONS, Make a set of investigations of three different structures and how they work with the land. Development Synthesis Two: Choreography, colour, light, material, crowd versus the individual delineation, studies Development Draw Up and review MODEL The design studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.
Prerequisites: AR4002

PD4101 - DESIGN STUDIO 1
ECTS Credits: 6 (Year 2 Module)
School of Architecture and Product Design

Rationale and Purpose of the Module: To introduce the fundamental skills and cognitive processes of product design and to lay the foundations for subsequent Design Studio modules. These will be taught under the following headings: Design Methods, Design Techniques and Design History.

Syllabus: This module comprises three complimentary streams, which are further developed in Design Studio 2 (semester 2): • Introduction to Design Methods • Introduction to Design Techniques • Introduction to Design History

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PD4024 - DESIGN FOR ENVIRONMENTAL SUSTAINABILITY
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
School of Architecture and Product Design

Rationale and Purpose of the Module: To familiarise students with issues relating to energy consumption, and the realisation of current exhaustible engineering activities which is essential for a change towards sustainable production. To present environmental impact assessment and ecological footprinting of products and processes used in the critical realisation of current unsustainable engineering trends. To equip students with abilities to perform environmental audits on products and processes. To outline all relevant legislative requirements relating to environmental aspects of products and processes, which is a key component of an environmental audit.
To provide an understanding and realisation of how sustainable design begins with the concept stages of a product.

Syllabus: Fossil fuels and global warming. Ecological impact of materials and processes. Land use and environmental impact. Optimisation of the

lifetime of products û shifting towards a cradle-to-cradle concept, combined with a Product Lifecycle Analysis (PLCA). Packaging design and analysis. Redesign and reengineering to minimise parts and fasteners. Transport, distribution and reverse logistics. Renewable materials and energy, repair, reuse and recycling. Materials selection for sustainability.
Irish Legislation covering packaging, extended producer responsibility, waste, and EU directives covering, accumulators, waste electrical and electronic equipment (WEEE), Energy using Products (EuP). Environmental Management Systems (EMS), product considerations in EMSs, and Environmental Auditing, all as outlined in the ISO 14000 family of environmental standards. Case studies of EMS and Environmental auditing

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PD4053 - DESIGN RESEARCH IN PRACTICE
ECTS Credits: 6 (Year 2 Module)
(Lab-Based Module)
School of Architecture and Product Design

Rationale and Purpose of the Module: To develop skills and an understanding of user-centred design research with particular emphasis on primary research methods. The students will be able to put into practice the primary and secondary research methods introduced in a class/studio setting. Ethnographic methods will underpin the module. Students will learn to analyse and synthesise findings, to understand user needs in the design process.

Syllabus: The following is an outline of topics covered: Tools and processes for user-centred design research. Primary and secondary research methods.
Ethnographic research methods. Analysis and synthesis of findings. Filtering criteria for user needs. - Data mapping.
Design Guide/Specification development.

School of Architecture and Product Design Year 3 Modules

AR4005 - DESIGN STUDIO 3A
ECTS Credits: 15 (Year 3 Module)
(Studio-Based Module)
Limited places available: 2
Restrictions: Architecture Portfolio required
School of Architecture and Product Design

Rationale and Purpose of the Module: The principle aim of Third-Year Design Studio is to enable the student to demonstrate a first synthesis of the disparate influences that go to make up an architectural project using the range of skills and tools an architect is required to use. The emphasis in the first term is on developing a thoroughly researched design proposal and to produce a set of competent design documents.

Syllabus: An agenda will be set in Design Studio. The basis for all propositions will have stated intent relative to societal ideas of place, collectivity and socio economic (or political) meaning. The architectural project brief will have inherent complexity, embodying personal space together with public space. Through the detailed study of architectural references, a concept of `now¿ relative to the past history of societal and architectural ideas will inform each student¿s proposition since both will be researched and presented in parallel. The material realisation of these social and cultural concepts is capable of conveying meaning in a contribution that the strictly functional provision of buildings does not make. The architectural proposition will move through a series of studies where the student is taught to use different scales, modes of operation and reference points. The emphasis will be on the mastery of investigative skills through a range of media on an ongoing basis.
Prerequisites: AR4004

AR4015 - GRAVITY AND REACTION 5
ECTS Credits: 3 (Year 3 Module)
(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

Restrictions: integrated with AR4045 and AR4056

School of Architecture and Product Design

Rationale and Purpose of the Module: In depth study of Load Path, in depth study of structural form, particularly as it relates to specific material properties. Learning through the analysis of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.

Syllabus: Continued Introduction to structural concepts. Topics covered will be portal frames, crane structure; RC beam design; timber truss design in qualitative process; shells, membranes. Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulaminated timber; steel; models to describe failure modes in structures. Students will research: Materials in the studio and in a site context.

Materials used in structural design andtheir relevant components Design and build in model form a simple bridge with calculated design loads and span. Prerequisites: AR4014

AR4025 - REPRESENTATION / DRAWING 5

ECTS Credits: 3 (Year 3 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

School of Architecture and Product Design

Rationale and Purpose of the Module: In this module students are introduced to the computer and related modes of representation, in conjunction with continuing studies in hand drawing. Switching between virtual and analogue modes of representation, e.g. models, drawings, digital photography, photoshop, illustrator, and other graphics programmes will be explored as tools of transformation and spatial, logical, and structural exploration.

Syllabus: Widening the pallet of modes of representation that the student must master, drawing is taught as a tool of observation, a tool of thinking and a tool of representation, this course consists of three different types of drawing exercises: Moving actively between analogue and digital modes of representation, students will develop their ideas between media, exploiting the most powerful aspects of each in terms of their design. Students will develop in parallel their hand drawings skills.

Prerequisites: AR4024

AR4045 - ASSEMBLY AND TECHNIQUES 4

ECTS Credits: 3 (Year 3 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

Restrictions: integrated with AR4015 and AR4056

School of Architecture and Product Design

Rationale and Purpose of the Module: The aims of this class are:

to introduce students to the initial studies required to later generate a comprehensive set of working drawing of a third-year design studio project.

to develop further the students, own intuitive skills in technique alongside knowledge of available construction technology today. to develop the student's capacity to interrogate and develop design decisions through construction principles

Syllabus: Developed principles of assembly and techniques will be further studied concurrently with the production of a full set of working drawings.

DRAWING EXERCISE: Each weekly exercise will concentrate on developing one technical aspect of a building. The culmination of the term will be that each student would have completed a comprehensive set of working drawings. LECTURE COURSE: A weekly lecture will introduce students to developed construction principles, systems and

methods. Students will be asked to choose a construction system/method at the start of the year. Each student will complete a short dissertation on the chosen topic for the end of the module.
DIARY OF A BUILDING: Students will be assigned a building of appropriate complexity at the start of the year. Fortnightly supervised visits will be made to the building site.
Prerequisites: AR4043

AR4056 - ENVIRONMENTAL SYSTEMS AND FORCES 5
ECTS Credits: 3 (Year 3 Module)
(Studio-Based Module)
Limited places available: 2
Restrictions: Architecture/design background and portfolio required
Restrictions: integrated with AR4015 and AR4056
School of Architecture and Product Design

Rationale and Purpose of the Module:
Sustainable development is a base for the future of human society on our planet. Therefore, a basic understanding of the physical backgrounds and interconnections is necessary. This modules content spans from global to local and micro- climate, to energy and it¿s different forms and sources towards materials and their properties.

Syllabus: Understanding precisely how the performance of an integrated and unrelated set of elements will perform in a specific environment comes through simulation, modelling and analysis. Both analogue and digital means of simulation will be taught. Daylight modelling, building fabric U-value calculations, air-tightness, and CFD modelling of buildings are some examples of the types of essential simulation during the design process. The emphasis of the course is on the acquiring analytical techniques and skills required to evaluate the environmental performance of a set of elements under a specific condition.
Building on observation, analysis and design, students will develop skills for critical inquiry into the nature of architectural design and how it engages with the concepts of site, place and comfort. The idea of `boundary conditions¿ will be developed in the context of an integrated understanding of structure + environment + materials.
The following subjects will be covered:
Day-lighting and artificial lighting design in relation to a large-scale physical model Thermal energy losses and gains through envelope Performance of a building in relation to air movement inside and outside (applied CFD modelling tools) Material selection and embodied energy considerations
Energy/Water/Waste systems integration/design
Prerequisites: AR4054

AR4035 - HISTORY AND THEORY OF ARCHITECTURE 5
ECTS Credits: 3 (Year 3 Module)
(Studio-Based Module)
Limited places available: 2
(Lecture Course)
School of Architecture and Product Design

Rationale and Purpose of the Module: The third-year program in Architectural Research continues the comprehensive survey of the history of architecture and urbanism in the programme curriculum. This module exposes students to the relationship of architecture to technology and materials, both naturally occurring and those produced by man both in Ireland and globally.
The goal for the course is to give students a broad introduction to architecture throughout the ages, from the classical Greek and Roman periods to the present day while introducing them to the role that materials and technology have in architecture.

Syllabus: Through lectures, discussion seminars, and writing the course will survey the relationship between architecture, materials, and technology from prehistory to the present day.
Starting with the classical Greek and Roman periods, into the present day Silicone Age, both society and architecture have been profoundly influenced by materials and technology. This course will be composed of a research and readings on the period by experts in the history of science and technology, Irish history, structural engineering, materials science, structures, and the history of architecture.

Students will complete their own directed research projects on a particular work of architecture, and encounter the work directly, making observations from experience with the physical object.
Prerequisites: AR4034

PD4105 - DESIGN STUDIO 5 (INDUSTRY)
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
(Weeks 9 to 12) This module along with PD4115 and PD4005 must be taken together as a suite as they run in three four week blocks rather than three parallel twelve-week modules.
School of Architecture and Product Design

Rationale and Purpose of the Module: The aim of this module is to build on the design skills developed through the previous Design Studio modules (1-4) with a focus on design refinement and implementation. Students will resolve their designs to manufacturable detail for the first time, preparing them for Co-Op placements in the following semester.

Syllabus: • Design refinement and implementation. • Design for manufacturing and material selection. • Surface modelling (CAD).

PD4115 - DESIGN STUDIO 6 (COMMUNITY)
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)

(Weeks 1 to 4) This module along with PD4005 and PD4105 must be taken together as a suite as they run in three four week blocks rather than three parallel twelve-week modules.
School of Architecture and Product Design

Rationale and Purpose of the Module: This module facilitates students to see the impact their work will have on individual users and society as a whole. Focusing on team projects and collaborative work, students will work through design issues and complex problems to develop solutions that improve the lives of users and community (both local and international).

Syllabus: • Emerging Design Trends: Service Design, Transformative Design, Product Service Systems, Participatory Design, Universal/ Inclusive Design. • Responsible design practice (ethics, social & cultural inclusion, diversity of practice). • Forecasting and future trends. • Design for Society, Social Design, Social Innovation, and Design for Social Impact.

PD4005 - ADVANCED MODELLING OF FORM
ECTS Credits: 6 (Year 3 Module)
(Lab-Based Module)
(Weeks 5 to 8) This module along with PD4115 and PD4105 must be taken together as a suite as they run in three four week blocks rather than three parallel twelve-week modules.
School of Architecture and Product Design

Rationale and Purpose of the Module: The module aims to develop students' skills in the expression of complex forms through 3D modelling (hand skills) and digital representation. Enhancing these skills will further augment the learners' appreciation of complex 3D form generation and downstream uses of Computer-Aided Design in visualization, manufacturing, rapid prototyping & digital representation.

Syllabus: - Organic complex form: appreciation & expression.
- Form modelling, emphasizing, hand-skills in generating high-quality sculptural outcomes. - Advanced CAD tools surfacing CAD package(s). - Preparation of digital models for manufacture and rapid prototyping. - Design Visualisation and graphic presentation of digital models.

School of Architecture and Product Design Year 4 Modules

AR4007 - DESIGN STUDIO 4A
ECTS Credits: 18 (Year 4 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture Portfolio required

School of Architecture and Product Design

Rationale and Purpose of the Module: In order to facilitate more extensive and, at the same time, more focused design projects and adequately comprehensive thesis projects, credits awarded to Design Studio 4a and 4b increase to 18 credits while the number of parallel modules is reduced

Syllabus: In Y4 students start a personal pursuit; they must - through their design projects and their research work - relate to the world of architecture in their own personal way. Students are expected and asked to voice their position in architecture, to find their direction through architectural design. Students develop a method of research and allocate significant time to the research part of the curriculum. The architectural project is tightly allied to construction and the physicality of building; construction technology is an important part of the years work. A research led project in the autumn semester opens the expanse of architectural intelligence into circumscribed cultural and environmental fields. Students develop a fluency in the means of making of and thinking through things in terms of structure, technology, and environment to the point where they can rise above the practicalities and conceptualise as well.

AR4317 - Advanced Construction 1

ECTS Credits: 3 (Year 4 Module)

(Studio-Based Module)

Limited places available: 2

Restrictions: Architecture/design background and portfolio required

School of Architecture and Product Design

Rationale and Purpose of the Module: An extended and clearly structured curriculum in construction design to induce a more innovative and imaginary approach to materials and details. In order to ensure the expected high level of competency in advanced building construction (at an industrial scale and with respect to contemporary and innovative technologies) SAUL introduces a set of Advanced Construction modules throughout Y4 and Y5 in close relation to and in support of the Design Studio projects.

Syllabus: Architecture students learn best by imagining, developing and realising (full-scale) prototype structures through which ideas can be tested, documented and communicated. Through actual engagement in all the stages of making and building, students have a unique opportunity to develop a rich phenomenal understanding of architecture. Closely related to Design Studio, Advanced Construction informs and supports the students individual design studio projects; directed and independent research on advanced construction is applied to these projects. After revisiting traditional and conventional (vernacular) forms of building taxonomy and production techniques in a range of materials (stone, concrete, metal, timber, fabric and polymers) staff and students engage more advanced means of fabrication (including milling, folding, laminating, sewing, stacking, interlocking, hanging, injection moulding, compositing, extrusion, weaving and bundling). Spatially and programmatically this will entail various degrees of articulation from the standardised, low-tech component to the highly articulated formal element, avoiding self-similar repetition in favour of the diversity of the composite.

AR4327 – CULTURE PLACE ENVIRONMENT (BUILDING LAND)

ECTS Credits: 6 (Year 4/5 Module)

(Studio-Based Module)

Limited places available: 2

Architecture background is not required

ELECTIVE: Cannot guarantee class is running until the beginning of the semester; scheduling conflicts possible.

School of Architecture and Product Design

Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the

core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (short-term) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level. The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff. There are many ways of reading, examining, explaining and presenting the city. How the city represents itself or rather the aesthetic of the city is dependent on so many flows and forces. Our relationship with the city is constantly under interrogation simply because as the environment of the city changes just so we change in response. This module proposes to interrogate the evolution of the constructed territory. It hopes to build an understanding of relations within the given environment concurrent with their historical importance and their place in the canon of the built place.

AR4347 - Design Philosophy

ECTS Credits: 6

(Year 4/5 Module)

(Studio-Based Module)

Limited places available: 2

Architecture background is not required

ELECTIVE: Cannot guarantee class is running until the beginning of the semester; scheduling conflicts possible.

School of Architecture and Product Design

Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level. The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff. Considering a wide array of research

processes from the scholarly to the wildly eccentric, this module will analyse the relationship between inquiries into archives, sites and objects and the structures used to organize the results. Taking research beyond a mundane or tedious task, this module will uncover the researchers power to make strange and unpredictable the world of neat certainties. Subsequently, it will relate the way we position ourselves in the world, the way we describe it, to the way we act within and upon it.

AR4357 - Architectural Form & Culture

ECTS Credits: 6

(Year 4/5 Module)

(Studio-Based Module)

Limited places available: 2

Architecture background is not required

ELECTIVE: Cannot guarantee class is running until the beginning of the semester; scheduling conflicts possible.

School of Architecture and Product Design

Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level. The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff. This module will map the contradictory and polemical understandings of the role performed by the façade in both architectural discourse and contemporary architectural practice. Using a set of constructed binary conditions as an organising matrix for discussion, this module will look critically at the slippery allocation of meaning and performance of the most public side of architecture.

AR4397 - UTOPIAN STUDIES

ECTS Credits: 6

(Year 4/5 Module)

(Studio-Based Module)

Limited places available: 2

Architecture background is not required

ELECTIVE: Cannot guarantee class is running until the beginning of the semester; scheduling conflicts possible.

School of Architecture and Product Design

Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (short term) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level. The elective modules have been conceived and created to give venue to research, to permit the

students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, the elective module will be delivered through a programme of lectures, seminar discussions and case study presentations. - The subject matter can change depending on the interest and availability of academic staff. This module will examine the nature and history of utopianism, especially in relation to the processes of the imagination and social design. It will consider utopianism in all its manifestations, including books and buildings, intentional communities and political movements; and it will especially pay attention to the role of the utopian method in producing the built environment. To do so, students will read and discuss work that describes and enacts utopia in description and theory and in fiction and film (especially science fiction). Classes will be comprised of a lecture, followed by close discussion of assigned texts.

AR4407 - ARCHITECTURE INTELLIGENCE UNIT

ECTS Credits: 6

(Year 4/5 Module)

(Studio-Based Module)

Limited places available: 2

Architecture background is not required

ELECTIVE: Cannot guarantee class is running until the beginning of the semester; scheduling conflicts possible.

School of Architecture and Product Design

Rationale and Purpose of the Module: Students are offered the opportunity to tailor their education to a larger degree in fourth and fifth year, with the invitation to make choices of modules beside the core Design Studio and adjacent modules. The introduction of architecture electives is intended to provide a flexible framework to accommodate the diverse field of interests and (shortterm) research projects within architecture, and to allow students to pursue their own personal interests within architecture. Smaller classes allow for in-depth interrogation of the subject at an advanced level. The elective modules have been conceived and created to give venue to research, to permit the students particular (and varying) interests to diversify and develop - apart from the Design Studio. This is markedly different from the lower three years of the course, where integration is the focus of the course, coordination between modules and Design Studio is essential, and particular student interests are less relevant than developing competence as an architect. Therefore the content of the elective modules cannot be specifically related to the Design Studio - this is to allow the student the space to start making their own decisions and setting their own direction.

Syllabus: Architecture electives provide a flexible framework to accommodate (short-term) research projects on a wide spectrum of issues, and to allow students to pursue their own personal interests within architecture. Focusing on case studies, architectural scenarios and design strategies, the elective module will be delivered in an intense workshop format. - The subject matter will vary depending on research interests, collaboration agreements, and additionally available funding. As part of a university, IU offers an unbiased platform to allow a discussion and exploration with every interested party - local authorities, stakeholders, companies, conservation bodies, planners, professional architects, engineers etc. The research will engage both interested professionals and students of architecture in an exciting opportunity to demonstrate the capacity of architecture in a wider set of imminent and pressing questions. As a group,

IU works in a strategic way, located within the context of ongoing work at SAUL.
