Introduction

The University of Limerick operates a modular 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 on these modules is subject to academic prerequisites, timetabling constraints and ceilings on enrolments. The module descriptions that follow present an outline of the salient topics covered in each module.

Normal course load is 5 modules per semester.

Module Key

The module code is the key in most cases to find out when the class is running.

Example CU4051

CU is the subject area

4 is the type of study – only modules beginning in 4 are offered to study abroad students.
5 and 6 are postgraduate modules and modules beginning in 2 are certificate courses/access courses.

05 is just the departments way to distinguish between classes

The final digit is the only way to determine which semester it will run in.
1, 3, 5, 7 are fall semester classes
2, 4, 6, 8 are spring semester classes

1 and 2 are first year classes
3 and 4 are second year classes
5 and 6 are third year classes
7 and 8 are fourth year classes.

This is the usual key for classes but there are always exceptions…(of Course)

Modules featured in this Booklet

All modules are in alphabetical order by module code.

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*Only open to Journalism Majors

Disclaimer

The content of this booklet are for information purposes only and should not be viewed as the basis of a contract between student and the University. No guarantee is given that modules may not be altered, cancelled or otherwise amended at any time.
AC4001 - PRINCIPLES OF ACCOUNTING
ECTS Credits: 6

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 intergrating ethics into the subject matter.

Prerequisites: none

AC4213 - FINANCIAL ACCOUNTING
ECTS Credits: 6

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.

AC5007 - ADVANCED FINANCIAL REPORTING
ECTS Credits: 6

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.

AC4305 - FINANCIAL INFORMATION ANALYSIS
ECTS Credits: 6

Accounting & Finance

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

AC4417 - MANAGEMENT ACCOUNTING 1
ECTS Credits: 6
Accounting & Finance

Rationale and Purpose of the Module: This module 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.

AR2001 - FAB LEARNING PORTFOLIO
ECTS Credits: 12

School of Architecture

Rationale and Purpose of the Module: The central objective of this module is to promote both the understanding and development of a range of skills on digital fabrication in different design areas, adding value to the corporate environment and to their careers. The module aims to inform and facilitate the development of specific skills, which will be utilised in the workplace, through the application of theory encountered throughout the programme.

This module also aims to provide an opportunity for students to reflect on the development these key skills in an open and supportive learning environment. The module supports the work of students in translating their study of their own practice into a portfolio of work reflecting their development and achievements in the programme.

Syllabus: Personal Portfolio Development, Constructing a portfolio of experiences in projects using a combination of different digital fabrication technologies.

Use a combination of general and specialist knowledge and understanding the use of existing and emerging digital fabrication technologies. Apply appropriate theoretical and practical methods to the design, analysis and fabrication of solutions based on digital fabrication technologies. Use effective communication and interpersonal skills.

AR4031 - HISTORY AND THEORY OF ARCHITECTURE 1
ECTS Credits: 3

School of Architecture

Rationale and Purpose of the Module: The first year program in History-Theory aims to expand students’ 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 field such as architecture is 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 give students 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. Projects discussed include Haussmann’s Boulevards, the Paris Opera, Mies’ Friedrichstrasse Skyscraper, the Villa Savoye, the Barcelona Pavilion, the Bauhaus, Archigram’s Instant City, Superstudio’s Continuous Monument, Herzog and de Meuron’s Signal Box Auf dem Wolf, and the Sendai Mediatheque. Readings by authors such as Rem Koolhaas, Colin Rowe, Michel Foucault, St. Brendan, Guy Debdor, John McPhee, John Stilgoe, Robert Smithson, and Georg Simmel will challenge students with the diverse ways by which we can describe sites. We will visit three nearby sites first-hand in order to learn how to discuss them. Afternoon writing workshops will focus on describing these sites.
deal with the shape of the city: (Medieval, Renaissance, Baroque and Industrial ideals of the city, with emphasis on land use in relation to buildings and spaces between buildings, building land in Ireland today; not about the law but about trends, patterns, densities.

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. The course focuses on the body in modernism, e. g. the body in an emergent consumer environment and visual culture (Joseph Paxton/Es Crystal Palace, the department stores, the arcades), as an agent of production and instrument of sensation (William Morris, Art Nouveau, the Secessionstil), in motion (Frank Lloyd Wright, the Werkbund, Futurism, de Stijl), in a culture of hygiene (Tony Garnier, Le Corbusier/Es urbanism, the Suburb), at home and in exhibition (the International Style, the Schindler House, the Eames House, the Farnsworth House, Johnson/Es Glass House), and nomadic (Team X, Kurokawa, the SmithsonÆs House, the Farnsworth House, Johnson/Es Glass House), and nomadic (Team X, Kurokawa, the SmithsonÆs House, the Farnsworth House, Johnson/Es Glass House).

The third year introduces to architecture throughout the ages, from the classical Greek and Roman periods to the present day ôSilicon Age,ö 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: AR4032

AR4035 - HISTORY AND THEORY OF ARCHITECTURE 5
ECTS Credits: 3

School of Architecture

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 ôSilicon Age,ö 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

AR4337 - Urban Design
ECTS Credits: 6

School of Architecture

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.

The module addresses the recent history, current discourse and emerging processes of urban design and place-based planning governance, with an emphasis on the design of civic space. It explores directly the meaning and application of sustainable development policies in urban development. It investigates, particularly, contemporary examples of interdisciplinary practice in urban design and emerging, bottom-up approaches to place making as a design practice. The course will develop a context for understanding the role of design in shaping the urban environment, both physically and culturally.

Prerequisites: AR4034

AR4347 - Design Philosophy
ECTS Credits: 6

School of Architecture

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**AR4367 - Digital Technology**  
**ECTS Credits:** 6

**School of Architecture**

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**Syllabus:** The elective provides the theoretical framework, tool expertise and technical skills required to analyse, understand and represent three-dimensional complex forms (curves, surfaces and volumes) using digital tools. NURBS-based modelling tools and physically correct rendering tools are taught and applied in the process, specifically Rhino and Maxwell Render. The course will also present a number of techniques for sketching complex surfaces using pencil. The course also analyses prototyping and fabrication processes related to these complex forms, and students will study outstanding references of their application in contemporary design.

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**AR4397 - UTOPIAN STUDIES**  
**ECTS Credits:** 6

**School of Architecture**

**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.

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**AS2391 - MANUFACTURING TECHNOLOGY AND CAD**  
**ECTS Credits:** 6

**Design and Manufacturing Technology**

**Rationale and Purpose of the Module:** Introduce students to engineering principles and techniques prior to them starting an undergraduate engineering programme.

**Syllabus:** * Understanding the role of a measurement and calibration system in engineering.  
* Understand the basic techniques used in joining components/materials.  
* Understand the principles of machining.  
* Acquire a basic understanding of a CAD package and principles of engineering drawing.

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**BC4401 - INTRODUCTION TO INDUSTRIAL BIOCHEMISTRY**
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: To introduce the student to the discipline of industrial biochemistry.

To provide the student with a reference framework for future core course modules.

To generate student interest and enthusiasm for the subject area by focusing upon relevant, topical issues of broad public interest.

Syllabus:

- Understand viruses and their life cycles.
- To develop an understanding of metabolic pathways.
- Familiarise the students with their theoretical foundations and practical applications.
- To develop core laboratory skills relevant to molecular biology.
- To prepare the students for careers in the biotechnological/biopharmaceutical/etc industries.

BC4825 - MICROBIAL TECHNOLOGY 2
ECTS Credits: 6

Chemical & Environmental Science

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.

Prerequisites: BC4803, BY4001

BC4905 - GENETIC ENGINEERING
ECTS Credits: 6

Chemical & Environmental Science

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
Rationale and Purpose of the Module: To introduce students to the uses and applications of modern bioinformatics in elucidation of protein and genetic information using both theoretical and practical approaches.


**Prerequisites:** BC4904, BC4905

**BY4001 - BIOLOGY 1**

**ECTS Credits:** 6

**Life Sciences**

Rationale and Purpose of the Module: To introduce fundamental concepts of biological structure and function.

To provide an introductory course in cellular energetics and respiration, photosynthesis, animal physiology, and microbiology.

**Syllabus:** Introduction to biology, characteristics of life, scientific methodology, biomolecules, chemistry of the cell and organism, cell structure and function, membrane structure and function. Cellular energy and metabolism, enzymes and enzyme reactions, cellular respiration; photosynthesis. Introduction to micro-organisms, microbiology, prokaryotic and eukaryotic organisms. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns.

**BY4013 - GENERAL MICROBIOLOGY**

**ECTS Credits:** 6

**Life Sciences**

Rationale and Purpose of the Module: This course 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: globalisation; international trade; corporate social responsibility; global branding; international management strategy.

**BY4011 - GENERAL BIOLOGY**

**ECTS Credits:** 6

**Life Sciences**

Rationale and Purpose of the Module: To introduce fundamental concepts of biological structure and function.

To provide an introductory course in cellular energetics and respiration, photosynthesis, ecology, and microbiology.

**Syllabus:** Introduction to biology, characteristics of life, scientific methodology, biomolecules, chemistry of the cell and organism, cell structure and function, membrane structure and function. Cellular energy and metabolism, enzymes and enzyme reactions, cellular respiration and photosynthesis. Introduction to micro-organisms, microbiology, prokaryotic and eukaryotic organisms. Ecology.

**BY4001 - BIOLOGY 1**

**ECTS Credits:** 6

**Life Sciences**

Rationale and Purpose of the Module: To introduce fundamental concepts of biological structure and function.

To provide an introductory course in cellular energetics and respiration, photosynthesis, animal physiology, and microbiology.

**Syllabus:** Introduction to biology, characteristics of life, scientific methodology, biomolecules, chemistry of the cell and organism, cell structure and function, membrane structure and function. Cellular energy and metabolism, enzymes and enzyme reactions, cellular respiration; photosynthesis. Introduction to micro-organisms, microbiology, prokaryotic and eukaryotic organisms. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns.

**BY4013 - GENERAL MICROBIOLOGY**

**ECTS Credits:** 6

**Life 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

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**BY4015 - PLANT PHYSIOLOGY**  
**ECTS Credits:** 6  
**Life Sciences**  

**Rationale and Purpose of the Module:** To introduce the students to the principles and applications of plant physiology.


**Prerequisites:** BY4002

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**BY4023 - ANIMAL DIVERSITY**  
**ECTS Credits:** 6  
**Life 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.

**Prerequisites:** BY4002, BY4001

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**BY4045 - CELL BIOLOGY AND BIOCHEMISTRY**  
**ECTS Credits:** 6  
**Life Sciences**  

**Rationale and Purpose of the Module:** To introduce the students to teaching plant physiology.

**Syllabus:** Life Sciences

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**BY4065 - CHEMISTRY OF BIOLOGICAL SYSTEMS**  
**ECTS Credits:** 6  
**Life Sciences**  

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**BY4204 - PRINCIPLES OF HUMAN PHYSIOLOGY**  
**ECTS Credits:** 6  
**Life Sciences**  

**Rationale and Purpose of the Module:** To introduce students to the basic concepts and principles of human physiology

**Syllabus:** This module will examine the structure and function of the major human physiological systems. Physiology of the blood, circulation and lymphatic systems. The nervous system: central, peripheral and autonomic. Physiology of skeletal, muscle and integumentary systems. The respiratory system: mechanical properties of breathing, pulmonary and bronchial circulation, the transport of oxygen and carbon dioxide. The digestive system: the gastro-intestinal tract, intake and absorption of nutrients. The renal system: kidney structure and function, osmoregulation and homeostasis, regulation of acid balance. The endocrine system: regulation of calcium and phosphate metabolism. Reproductive system. Sensory system: perception of taste and aroma. The influence of physiological conditions on nutrient absorption will be considered e.g., inborn errors of metabolism on iron metabolism. The impact of food constituents on physiology will be examined e.g., ingestion of toxins.
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:
2. 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.
3. 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

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CE4003 - FLUID MECHANICS
ECTS Credits: 3

Civil Engineering and Materials Science

Rationale and Purpose of the Module: Aims & Objectives:
Introduction the physical processes which govern the behaviour of liquids at rest and in motion, relating to hydraulic engineering.

Key objectives:
* Develop the fundamental principles underlying hydrostatics.
* Introduce hydrodynamic principles and the basic laws of fluid flow.
* Explain pipe flow and network design and basic hydraulic machinery.
* Include theoretical and practical aspects of open channel flows.
* Practical applications of hydraulic principles will be applied to different hydraulic structures to provide experience and confidence in problem-solving.

Syllabus:
* Review the properties of Fluids, Hydrostatic forces and Pressure measurement.

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CE4007 - WATER MANAGEMENT SYSTEMS
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: This module is proposed to enhance the existing water and environmental engineering content and to supplement existing modules in the development of the B.E. in Civil Engineering. The module seeks to train students in the design and modeling of water distribution and water collection systems including hydraulic design of treatment plants and will synthesise the principles learned in the prerequisite modules.

Syllabus:
Context and principles of water management from catchment to consumer; structural and hydraulic components of water distribution systems (reservoirs, pump stations, surge tanks) and water / wastewater...
collection systems (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 simple numerical analysis tools for the design and sensitivity analysis 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, network capacity, flow velocity, sediment transport, design & application of hydraulic structures; hydraulic design of treatment plants; hydraulic profiles; long term economic and sustainability design and operation of hydraulic systems.

CE4014 - HYDRAULICS AND WATER ENGINEERING
ECTS Credits: 6
Civil Engineering and Materials Science
Rationale and Purpose of the Module: This module introduces the theory and practice of modern water engineering looking at water in the natural Hydrological cycle and the fundamental concepts in water treatment technologies and water supply.

Syllabus: Hydrology: The hydrological cycle; Water balance equation; Hydrologic Budgets; Precipitation: intensity, duration & return periods; Surface run-off and drainage systems; Sustainable urban drainage systems, flow attenuation, Aquifers; Groundwater flow; Measurement and monitoring of stream flow and groundwater; Hydrograph generation run-off, unit, synthetic; Channel Storage; Mass diagrams; Routing flood, reservoir & channel. Water Treatment: Characteristics of water; Water demand rates and peak flows; Distribution systems and service reservoirs; Physical treatment - screening, sedimentation; Clarification and settlement; Filtration with granular media and mechanical; Biological oxidation; Aerobic oxidation plants; Chemical treatment - coagulation, flocculation; Disinfection chlorine, ozone & other; Fluoridation; Sludge dewatering and disposal; Treatment plant design. Applied Hydraulics: Design of water distribution pipe networks, pump types and characteristics, surface profiles and backwater curves, design of hydraulic structures.

Prerequisites: CE4003

CE4015 - SOIL MECHANICS
ECTS Credits: 6
Civil Engineering and Materials Science
Rationale and Purpose of the Module: This module builds on the material covered in WT4014 by further exploring soil mechanics using critical state theory. The course is designed to challenge the student to master the key concepts in soil mechanics and apply these concepts in projects and self-directed learning to achieve the following key objectives:

Key objectives
* To master the concepts of critical state theory.
* Introduce a simple constitutive soil model ü Cam clay.
* To generate enthusiasm for the subject through field trips, practical experimentation and case histories.

Syllabus: * Basic mechanics
Stresses, strains; plane, axial symmetry, 2-D and 3-D conditions; stress ratio and dilation; slip surfaces; analysis of stress and strain ü MohrÆs circle; essentials of material behaviour; Stress-strain behaviour, stiffness and strength; Choice of parameters for stress and strain; Constitutive equations; Time & rate effects

* Laboratory testing of soils
Standard tests, purposes and specification; Shear box, triaxial and oedometer tests; Interpretation ü OCR.

* Consolidation
Basic mechanisms of consolidation and 1-D consolidation theory; Solutions and applications for 1-D consolidation; Determination of cv, cc and cs from oedometer tests; Calculation of foundation settlement
* Critical state strength of soil
Soil behaviour in shear; Peak, ultimate and residual strengths; Critical states; Undrained strength; Estimation of critical state strength parameters from classification tests
* Cam clay model
Basic features of the cam clay model and its application in computer predictions of soil behaviour; State boundary surface; Yielding and hardening

Prerequisites: WT4014

CE4027 - ADVANCED STRUCTURES

ECTS Credits: 6
Civil Engineering and Materials Science
Rationale and Purpose of the Module: Module modified to reflect movement of more advanced topics from earlier structural engineering modules. This facilitates the advanced topics to be explored in greater depth in this module.

Syllabus: Structural scheme design of specialist structures - examples include grandstand, hospital, high-rise, long-span, reservoir, etc. Overall stability of structural schemes. Preliminary sizing of structural components in a variety of materials. Builability of different structure types / components. Communication of concepts using hand sketches and oral presentations. Detailed design and detailing of structural components for a specialist structure therefore typically two of the following component types: pre-stressed and post-tensioned concrete; water retaining concrete; steel-concrete composite; steel plate- and box- girders; Long span components with stiffness critical design criteria.

CE4033 - MODELLING AND ANALYSIS OF FLUID SYSTEMS
ECTS Credits: 3
Civil Engineering and Materials Science
Rationale and Purpose of the Module: The purpose of this module is to two-fold. Students are introduced to scale analysis techniques and taught how to interpret and use existing correlations, as well as develop their own from experimental data. Secondly, students are introduced to the concept of potential flow and apply the theory to solve various problems commonly encountered by civil engineers.

Syllabus: Introduction to dimensional analysis/scale analysis/similarity analysis; comparison with design of experiments; conditions of similarity; derivation of dimensionless parameters; overview of dimensionless groups commonly employed in engineering; reading correlations and extracting useful data; derive correlations from experimental data; flow structures and transition regimes.

Introduce conservation equations; concept of potential flow; streamlines and equipotential lines; stream functions, point/line sources and sinks; flow around
CE4035 - REINFORCED CONCRETE AND MASONRY DESIGN  
ECTS Credits: 6

Civil Engineering and Materials Science  

Rationale and Purpose of the Module: This module introduces the design of structural elements in reinforced concrete and masonry with the following key objectives:

- To master the concepts in steel reinforced concrete.
- To develop the key concepts in pre-stressed concrete design.
- To introduce the concepts in the design of un-reinforced and reinforced masonry.

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 of appropriate RC slab type; Design of RC slabs, one-way, two-way and flat slabs; Punching shear resistance; Design of RC Columns, design formulae and design standard procedure for short/slender columns, principles of axial load-moment interaction diagram, balanced failure design, load and moment analysis; Design of RC retaining walls and foundations; RC Detailing; bonding, anchorage and curtailment.

Design of unreinforced masonry subjected to vertical and lateral loading.

Introduction to pre-stressed and post-tensioned concrete technology.

CE4045 - PROFESSIONAL PRACTICE 1  
ECTS Credits: 6

Civil Engineering and Materials Science  

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.


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.

CE4047 - WIND, OCEAN AND HYDRO ENERGY  
ECTS Credits: 6

Civil Engineering and Materials Science  

Rationale and Purpose of the Module: The purpose of this module is to introduce civil engineering and energy students to national and EU policy, resource assessment, conversion principles and electricity generation potential associated with renewable energy generated from wind, ocean & hydro resources. 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; 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


CE4205 - MICROCOMPUTER SYSTEMS  
ECTS Credits: 6

Electronic & Computer Engineering  

Rationale and Purpose of the Module: This module is designed for ‘transferee students’. Students must be capable of writing programs at assembly language level for some modern computer or microprocessor.

The main purpose is to:

1. Teach 8086 assembly language programming.

2. To introduce operating system design and implementation concepts based on a complete single-user, disk based operating system. MS-DOS and Microsoft Windows will be the example operating systems.

Syllabus: * [Introduction to Data and Computer Communications] Communications tasks; Protocol elements, characteristics, and functions; Protocol architectures; Reference communications models overview: OSI vs. TCP/IP (layers/E 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 Ø 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 protocols/E 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

**CE4701 - COMPUTER SOFTWARE 1**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: Introduce students to a high level object-oriented 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.

**Prerequisites:** CE4702

**CE4706 - SOFTWARE ENGINEERING 1**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: To introduce the domain of software engineering from a programmers 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


**CE4703 - COMPUTER SOFTWARE 3**

**ECTS Credits:** 6

**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).
CE4708 - ARTIFICIAL INTELLIGENCE
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: To provide the student with a solid grounding in the theoretical and practical foundations of artificial intelligence and expert systems.

Syllabus: Section (i) - Introduction to Prolog and "Logic Programming"
Section (ii) - State-Space Search
Section (iii) - Expert Systems
Section (iv) - Neural Networks

Prerequisites: CE4704

CG4003 - BIOPROCESS ENGINEERING 1
ECTS Credits: 6
Chemical & Environmental Science

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 method.

Prerequisites: EE4817

CG4001 - PROCESS ENGINEERING COMPUTATION METHODS
ECTS Credits: 6
Chemical & Environmental Science


Prerequisites: CE4703

CG4005 - CHEMICAL ENGINEERING THERMODYNAMICS
ECTS Credits: 6
Chemical & Environmental Science

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 method.

Chemical & Environmental Science

Prerequisites: CE4704

CG4817 - DIGITAL SIGNAL PROCESSING 1
ECTS Credits: 6
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.


Prerequisites: CE4703
CG4007 - SUSTAINABLE ENERGY PROCESSES
ECTS Credits: 6

Chemical & Environmental Science
Rationale and Purpose of the Module: Provision of a process engineering module to give a deeper and wider knowledge in energy processes, with emphasis on sustainability and renewability.

Syllabus: Overview of energy conversion/generation process fundamentals starting with combustion, elements of energy balance including heats of combustion, component balances, calorific values, excess air, efficiency and Carnot efficiency, and engineering solutions to maximize efficiency. This will lead to existing ideas for efficient energy generation (advanced generation) represented by Combined heat and power and Combined gas generation extended further to chemical energy generation represented by Fuel cells, Hydrogen production and Fuel re-synthesis. The novel energy conversion/generation ideas will be extended further to advanced nuclear power generation, represented by pebble-bed nuclear reactor. The knowledge of energy generation fundamentals will be enriched with the engineering principles of renewable energy generation, based on Solar, Geothermal, Biogas, Biomass, Wind and Ocean sources.

CG5031 - CHEMICAL ENGINEERING DESIGN METHODS 1
ECTS Credits: 6

Chemical & Environmental Science
Rationale and Purpose of the Module: To introduce the student to quantitative design methods and procedures. To develop skills in process flowsheeting and in the use of an industry-standard computer package for modeling/simulation of steady state and non-steady state chemical processing operations. To learn methods for industrial energy management and become familiar with their application in industrial operations. To become familiar and apply concepts and principles of health and safety. To give the student a thorough grounding in the principles and application of HAZOP methods. To provide a working knowledge of environmental impact and sustainability assessment, as applied to chemical processing operations.

Syllabus: Fundamentals of material and energy balances. Introduction to chemical process design and analysis. Introduction to Process Control and Instrumentation. Solid Materials Handling (size reduction, settling, elutriation, filtration, etc.) Among typical tutorial topics are the following: Review of Introductory Inorganic and Organic Chemistry Review of Chemical or Engineering Thermodynamics Review of Chemical Kinetics

CG4003 - METHODS 1
ECTS Credits: 6

Chemical & Environmental Science
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.


CG4017 - BIOPROCESS ENGINEERING 2
ECTS Credits: 6

Chemical & Environmental Science
Rationale and Purpose of the Module: To allow students with varying backgrounds to become familiar with those core aspects of chemical engineering that might be lacking in their prior experiences. Tutorials are tailored to the previous academic background of the individual student.

Syllabus: Review of quantitative design methods. Thermodynamic options for process design and simulation. 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. Flowsheet synthesis, analysis and evaluation: modular- and unit equation-based modes for flowsheet synthesis; rigorous unit equation models for flash, distillation, and heat exchange operations. Recycle of process mass and energy streams; partitioning, precedence ordering and
tearing; convergence criteria. Synthesis of separation systems: ideal distillation; azeotropic mixtures; distillation sequences.

Use of industry-standard computer package for modeling/simulation of steady state and non-steady state chemical processing operations.

Main design project selection. Preparation of preliminary mass and energy balances for main design project.

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**CH4001 - CHEMISTRY FOR ENGINEERS**
**ECTS Credits: 3**

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** Many students that enter the University of Limerick to study 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 with the various applications of chemistry in everyday life.


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**CH4003 - PHYSICAL CHEMISTRY 2**
**ECTS Credits: 6**

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:**

i. To facilitate the student in understanding of the reaction thermodynamics and the role of thermodynamics in chemical reaction processes.

ii. To familiarise the student with the various reaction kinetics, including some complex kinetic schemes, their interpretation and applications in the appraisal of industrial problems.

iii. To develop the students ability to design basic kinetic experiments and to extract kinetic information from the measurements of concentration-time based data. iv. To provide the student with the basic knowledge of commonly used spectrosopes

**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
- Basis of IR and UV spectroscopy, fluorescence and phosphorescence

**Prerequisites:** CH4002

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**CH4005 - PHYSICAL CHEMISTRY 4**
**ECTS Credits: 6**

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** To familiarise the student with the concepts of electrochemical systems under current flow situations.

To familiarise the student with electrochemical methods of chemical analysis.

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**CH4007 - ORGANIC PHARMACEUTICAL CHEMISTRY**
**ECTS Credits: 6**

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** To introduce applications of electrochemical methods in energy conversion and storage, sensors and production of chemicals

**Syllabus:**


Electron transfer reactions.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, chronoaamperometry, chronocoulometry, potentiometric stripping analysis, differential pulse techniques. Ion selective electrodes. Biosensors.

Electrodeposition: Electrocrytallisation, bath design, additives (brighteners, throwing and levelling power).


Electrocatalysis, electrolysis. Fuel cells, solar cells.

Surface analysis techniques, atomic force microscopy, scanning tunneling microscopy, scanning electrochemical microscopy.

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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 structures. Analgesic and antiarthritic compounds: aspirin, ibuprofen and naproxen, synthesis of naproxen, resolution and semi-synthesis detail to chain architecture. To explain 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.

**CH4013 - ORGANIC CHEMISTRY**

ECTS Credits: 6

Chemical & Environmental Science

**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/Cycloalkane); Electrophilic Addition Rxns., Carbocations; Polymerisation;(Alkenes/Cycloalkenes/Alkynes).


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 (Nucleophlic 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.


**CH4015 - ORGANIC CHEMISTRY 4**

ECTS Credits: 6

Chemical & Environmental Science

**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.


**CH4055 - ENVIRONMENTAL CATALYSIS**

ECTS Credits: 6

Chemical & Environmental Science

**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 denNOx from stationary sources, denNOx from mobile sources (petrol and diesel), destruction of VOCs, SO2 control. Catalyst characterisation: Surface area analysis, Elemental analysis, XRD and XPS.

**CH4103 - ORGANIC CHEMISTRY 2A(1)**

ECTS Credits: 6

Chemical & Environmental Science

**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 α-position.
Carboxylic acids: methods of preparation; using pKa as a measure of acid strength; formation of derivatives such as acid chlorides and esters.

Carboxylic acid derivatives & acid halides, anhydrides, esters and amides; nucleophilic displacement reactions; Acidic & Basic Properties; Aromatic structure and reactivity (Part 1): defining aromaticity and understanding aromatic stabilization; Hückel/ES 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

CH4153 - ORGANIC CHEMISTRY 2B
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: To build on and extend the functional group chemistry initiated in CH4152; develop the associated reactions/reaction mechanisms of the various functional groups; to cover, in depth, aromatic chemistry and the chemical behaviour of aromatic compounds; to introduce the field of stereochemistry; 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: Syllabus: Functional Group Chemistry Ctd; Aromaticity; Stereochemistry; Kinetics:

Aldehydes and Ketones: Typical Carbonyl Group Reactions (Nucleophilic Addition Reactions); Imines formation; Reaction with Grignard Reagents; Reduction Rxns; Wittig Rxn; Synthesis; Occurrence and Applications.

Carboxylic Acids and Carboxylic Acid Derivatives: - Esters, Acyl Halides, Acid Anhydrides and Amides. Nomenclature; Physical Properties; Acidity of the Carboxyl group; Preparation; Nucleophilic Acyl Substitution Reactions; Interconversion of Carboxylic Acid Derivatives; Reduction Rxns; Pharmaceutical Applications.

Fats, Oils, Soaps, Detergents; Current Trends.

Amines: Classification; Aliphatic and Aromatic Amines; Heterocyclic Amines; Basicity; Reactions; Occurrence.

Organic Polymers: Polysters, polyamides, polyethylene, biological polymers; Applications.

Aromatic Chemistry: Aromaticity Reviewed; Electrophilic Aromatic Substitution Rxns of Benzene; Functional Group Interconversion; Activating/Deactivating effects and Orientation. Aromatic Heterocyclic Compounds; Retrosynthesis. Occurrence.


Stereochemistry: Chirality and Achirality; Optical Activity; R/S Configuration of one chiral centre compounds (Cahn, Ingold & Prelog Rules); Perspective and Fischer Projections; Enantiomers, Diasteromers and Racemates. SN1/SN2 and E1/E2 Reactions of Haloalkanes- Kinetics and Stereochemistry.

Prerequisites: CH4152

CH4203 - INORGANIC CHEMISTRY 2
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: - To introduce students to the chemistry of transition metal complexes. - To describe and explain the main features of this chemistry in relation to position in the Periodic Table.


Bonding in transition metal complexes, crystal field theory, molecular orbital approach. p-bonding ligands

Organometallic compounds

Cluster compounds, multiple metal to metal bonds.

Chemistry of metallic s and p block elements group by group.

Prerequisites: CH4202

CH4253 - INORGANIC CHEMISTRY 2B
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: To enable the student to understand the principles underlying the chemistry of the s-, p- and d- block elements and 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.


Prerequisites: CH4701, CH4252

CH4303 - ANALYTICAL CHEMISTRY 1A
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: To give the students an understanding of and an appreciation for the qualitative and quantitative aspects of analytical
**Chemical & Environmental Science**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To enable the student to develop expertise in the process engineering of chemical operations.

**Syllabus:**
- To provide the student with a comprehensive knowledge of chemical reaction engineering and reactor design.
- To provide the student with a broad understanding of the principles of fluid flow and momentum transfer.
- To enable the student to develop expertise in the analysis and design of heat transfer processes.

**Prerequisites:** CH4405, CH4406, CH4407, CH4408, CH4409.

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**Chemical & Environmental Science**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To draw on a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

**Syllabus:**
- To develop 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 spectrancoupling constants, combined ir/1Hnmr spectra interpretation.

**Prerequisites:** CH4403

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**CHEMISTRY OF SOLIDS**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To introduce the classification and analytical methods for the qualitative and quantitative determination of solids and solid surfaces.

**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. [Surface Analysis], STM/AFM, LEED, XPS, AES, gas adsorption methods-BET, etc.

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**CHEMISTRY THROUGH ANALYTICAL METHODS**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To develop analytical methods for the qualitative and quantitative determination of solids and solid surfaces.

**Syllabus:**

**Prerequisites:** CH4404

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**CHEMISTRY THROUGH PROCESS TECHNOLOGY 2**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** The Process Technology 2 semester course is a continuation of Process Technology.

**Syllabus:**
- 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.

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**CHEMISTRY THROUGH PROCESS TECHNOLOGY 3**

**ECTS Credits:** 6

**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.

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**CHEMISTRY THROUGH PHYSICAL CHEMICAL PRINCIPLES OF DOSAGE FROM DESIGN**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To draw on a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

**Syllabus:**
- To provide the student with a broad understanding of the principles of fluid flow and momentum transfer.
- To enable the student to develop expertise in the analysis and design of separation processes.
- To provide the student with a comprehensive knowledge of chemical reaction engineering and reactor design.

**Prerequisites:** CH4403, CH4404, CH4405, CH4406, CH4407, CH4408, CH4409.

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**CHEMISTRY THROUGH PROCESS TECHNOLOGY 4**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To provide the student with a broad understanding of the principles of fluid flow and momentum transfer.

**Syllabus:**

**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.**

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**CHEMISTRY THROUGH PHARMACEUTICAL FORMULATION**

**ECTS Credits:** 6

**Rationale and Purpose of the Module:** To draw on a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

**Syllabus:**
- Physical Chemical principles of dosage from design.

**Particle science & powder technology Biopharmaceutics Dosage form design & manufacture**

**Prerequisites:** CH4003, CH4004, CH4005, CH4405, CH4415
**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 with the 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.
Periodic classification of the elements.
Introduction to chemical bonding.
Bond representation by Lewis dot, valence bond and molecular orbital structures. Hybridisation.
Chemical equilibrium.
Liquid solution chemistry. Acids and bases.
Selected applications of chemistry in domestic, medical and industrial environments.

**CH4751 - INTRODUCTORY CHEMISTRY**
ECTS Credits: 6

**Chemical & Environmental Science**

**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 with the 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.
Periodic classification of the elements.
Introduction to chemical bonding.
Bond representation by Lewis dot, valence bond and molecular orbital structures. Hybridisation.
Chemical equilibrium.
Liquid solution chemistry. Acids and bases.
Selected applications of chemistry in domestic, medical and industrial environments.
CM4203 - COMMUNICATIONS
ECTS Credits: 6
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.

CS4001 - COMPUTER APPLICATIONS FOR SCIENTISTS 1
ECTS Credits: 6
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.

CS4003 - INFORMATION SOCIETY 1: SOCIAL THEORIES OF NEW MEDIA
ECTS Credits: 6
Computer Science & Information Systems

Rationale and Purpose of the Module: The aim of the module is to gain an understanding of the social and cultural implications of new media. The impact new media have had on information sharing, processing and consumption and the changes on cultural attitudes and practices new media provoked. The course should also introduce students to the body of literature regarding social theory and new media and to the current research studying the impact of new communication technologies into our everyday lives.

Syllabus: Constituent elements of the course will be:
- definition of basic conceptual tools to understand research issues on media, and specifically new media
- discussion of the main theoretical frameworks developed for interpreting the social impact of new media
- critical analysis of the relationships between new media and their economical, organisational and cultural implications
Particular attention will be devoted to understanding communication technologies and technical innovations that contributed to shape the existing system of media, particularly with respect to the way media are perceived and internalised into the social community.

A specific part will be focusing on the study of the features of new emerging media (e.g. internet agents, distributed systems, intelligent environments) and the probable future social impact of these new communication technologies on culture.

CS4006 - INTELLIGENT SYSTEMS
ECTS Credits: 6
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 of Artificial Intelligence and Intelligent Systems. Given that students from a number of programmes will be taking this module, examples and projects work will be relevant to each group of students in so far as possible

Syllabus: To provide students with an understanding of the basic principles, methods and application domains for Artificial Intelligence. To introduce students to the development of Intelligent Systems, Knowledge Representation, and Machine Learning.

This module introduces the history and development of Intelligent system concepts. It includes discussions on AI and Expert Systems, Heuristic Search, Evolutionary Algorithms, Artificial Neural Networks, Cognitive Science, and issues in representation, reasoning and machine learning, together with a set of design principles for intelligent autonomous agents.

Real world applications of the course topics are also presented in areas such as robotics and financial prediction.

CS4007 - INFORMATION SOCIETY 2: THE INFORMATION AND KNOWLEDGE SOCIETY
ECTS Credits: 6
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.

Rationale and Purpose of the Module: This module will examine the claims of those who argue for the emergence of a radically new Information Society, as against those who see the emerging society as being fundamentally a continuation of existing socio-economic forces. The differing perspectives of technological determinism and social determinism will be examined. More nuanced frames for understanding human-technology relations, such as actor-network theory, will also be examined. These issues will be explored through practical examination of such areas as e-learning, e-commerce, e-communities, and virtual worlds. The emergence and use of the Internet will be one major theme of this module. This module will embody a strong historical perspective, examining earlier technological developments, e.g. electricity, and first-order, second-order and third-order effects. The notion of “information ecologies” will be examined, as well as the current debate about the “knowledge society”.

CS4009 - DIRECTED STUDIES 1
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The foundation and development of research skills.

Syllabus: Research Methods
Academic Writing
Preparation of a camera ready paper.
Contemporary approaches and issues in technology & aesthetics;

CS4013 - OBJECT ORIENTED DEVELOPMENT
ECTS Credits: 6

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;
Prequisites: CS4512

CS4019 - DIGITAL ARTS 1
ECTS Credits: 6

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: 1. Video Art
2. Film Theory
3. Installation and Interactive Art
4. Electronic and Experimental Music
5. Digitally Enabled Sculpture
6. Sound Art

CS4020 - INFORMATION SOCIETY
ECTS Credits: 6

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 (proprietary systems and IP, user generated content platform and online communities, open source movements).

CS4023 - OPERATING SYSTEMS
ECTS Credits: 6

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
(2) Concepts of processes, threads and multithreading and how they are implemented in a modern OS
(3) 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 eventcounts 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;
(7) I/O subsystem, directory name space; inodes; synchronous and asynchronous I/O; locking; buffering;
(8) 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;
(9) Fault tolerance and security;

Prerequisites: CS4211

CS4025 - DIGITAL AUDIO FUNDAMENTALS
ECTS Credits: 6

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 and compression; Digital audio distribution including storage, internet and digital audio broadcasting.

CS4028 - E-BUSINESS ARCHITECTURES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The rationale for including this module is that students reading degrees with a substantial computing component should have an understanding of the e-business domain.

distinctions, ownership.
Maintaining application state: Cookies, hidden fields, sessions.
Web application validation: problems, solutions, vulnerabilities
Web Application Frameworks (WAFs): the value of WAFs; WAF functionality; WAF types; WAF categories; enabling technology;
Selecting an Web Application Frameworks (WAF): overview and architecture of a WAF; criteria for evaluating WAFs;
E-marketing and e-advertising concepts; e-marketing communications; e-business payment systems; e-advertising charge models; e-advertisement types;
affiliate marketing, e-customer relationship management (E-CRM)
Social, legal and ethical issues in e-business;
Network Security: Security threats: malicious code, web application attacks, cyber vandalism, spoofing, denial of service attacks
Security solutions: encryption, digital signatures, digital certificates, firewalls, proxies
Wireless Technology and M-Business: location-identification technologies; wireless marketing; wireless payment options;
privacy and the wireless internet;
Prerequisites: CS4135

CS4047 - MULTIMEDIA INDUSTRY PERSPECTIVES
ECTS Credits: 6

Computer Science & Information Systems
Rationale and Purpose of the Module: The purpose of the Multimedia Industry Perspectives module is to develop student understanding and knowledge about various digital media industry processes, and to encourage students to examine digital media as a number of varying career options. It will provide the opportunity to introduce a number of external experts from a variety of multimedia industry related areas within a flexible framework.

Syllabus: This module introduces the students to a number of external experts from a variety of multimedia industry related areas, within a flexible framework.
The set of topics that will be discussed as part of this module will include:
Exploring the job market and applying for a job (CV and portfolio preparation, cover letter writing, maintaining an online presence).
Identifying professional communities, information resources and networking opportunities.
Job profiles and frequently required skills.
Recent development in the digital media domain.
Basic entrepreneurial skills: developing a business idea, drafting and presenting a business plan.
Each unit is assessed by coursework and/or class test; there is usually no formal examination at the end of the semester.

Prerequisites: CS4061, CS4072, CS4815

CS4053 - DIGITAL VIDEO FUNDAMENTALS
ECTS Credits: 6

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.

CS4055 - DATA MINING AND DATA WAREHOUSING
ECTS Credits: 6

Computer Science & Information Systems
Rationale and Purpose of the Module: To introduce students to the concepts and strategies for the design, development and implementation of data warehouses and repositories in order to enable their exploitation by knowledge discovery and data mining technologies.

Syllabus: What is data mining; why data mining; cross-industry standard process (CRISP-DM); CRISP-DM in action; data warehousing and enterprise intelligence; basic elements of data warehousing; what tasks can data mining approach; Data pre-processing: data cleaning, handling missing data, identifying misclassifications, graphical methods for identifying outliers, data transformation, numerical methods for identifying outliers;
Hypothesis testing versus exploratory data analysis: dealing with correlated variables, categorical variables, using exploratory to uncover anomalous fields, numerical variables, multivariate relationships, selecting intersecting subsets of the data for further investigation;

Data warehousing with intelligent agents: integration of database and knowledge-based systems, the role of artificial intelligence in warehousing;

Data warehouse performance: measuring data warehouse performance, performance and warehousing activities; data warehousing and OLAP; relationship between data warehousing and OLAP;

Aspects of building data warehouses: physical design, using functional independence, loading the warehouse, metadata management, operation phase, coherent management of warehouses for security;

Data mining task in discovering knowledge in data: statistical approaches to estimation and prediction, univariate methods: measures of centre and spread, statistical inference, confidence interval estimation, bivariate methods: simple linear regression, confidence interval for the mean value of y given x, prediction intervals for a randomly chosen value of y given x, multiple regression, verifying model assumptions;

Nearest neighbour algorithm, supervised versus unsupervised methods, classification task, k-nearest neighbour algorithm, distance function, combination function, quantifying attribute relevance, k-nearest neighbour algorithm for estimation and prediction;

Classification and regression trees, C4.5 algorithm, decision rules, comparison of the C5.0 and CART algorithms applied to real data;

Neural networks: neural networks for estimation and prediction, sigmoid activation function, neural networks for estimation and prediction, sigmoid activation function, quantifying attribute relevance, k-nearest neighbour algorithm, distance function, combination function, quantifying attribute relevance, k-nearest neighbour algorithm for estimation and prediction;

CS4057 - MACHINE LEARNING AND AI FOR GAMES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of the module is to provide the students with an overview of the applications of Artificial Intelligence and Machine Learning methods to Games and Game Development.

Syllabus: A series of case studies on the application of Artificial Intelligence and Machine Learning methods to all aspects of Games and Games Development will be presented. Example applications could include, Game Playing Programs, Path Finding, Control and Goal Oriented Action Planning, Multi-Agent Systems, Semi-automated Animation, and Sound Generation. The AI and Machine Learning methods discussed may include Symbolic AI, Expert Systems, Evolutionary Algorithms, Genetic Programming and Grammatical Evolution, Reinforcement Learning, Artificial Neural Networks, Swarm Intelligence, and Behaviour-Based Robotics and Control.

Prerequisites: CS4006

CS4063 - DIGITAL MEDIA SOFTWARE AND SYSTEMS 2
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To develop knowledge and competence of digital media systems.

Syllabus: To develop knowledge and competence of digital media systems:
1. A survey of sound synthesis techniques from early electronic music to contemporary signal processing
2. Creation of synthesis techniques in industry-standard software
3. Examination of additive synthesis in industry-standard software
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

CS4061 - MEDIA PROGRAMMING 1
ECTS Credits: 6

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: Program versus algorithm; brief introduction to number systems, character encoding and character sets; data representation and the role of computer memory; why digitize media, media objects and why study programming; programming process;
- Introduction to classes and objects;
- Primitive data types; declaring and defining variables/data; constant definitions; mixed data types; assignment statements; input and output;
- Arithmetic operators; casting; relational operators; logical operators; precedence rules;
- Working with turtle objects to create and display picture objects and to create and play sound objects; sending messages to objects; creating methods; method arguments and parameters;
- Introduction to how images are digitized/encoded; different models for colour and colour representations;
- Introduction to arrays, using arrays to store images;...

CS4067 - WRITING GAMES ANALYSIS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The primary objective of this module is to define the art and practice of writing computer games. Students discover how to analyse Games Discourse and are introduced to Wittgensteinian definitions of language-games as a tool for understanding and critiquing formal descriptions of
language, thought and the process of story creation and revelation. Students are given a heuristic for investigation that results in their discovery of a complicated network of similarities, overlapping and criss-crossings within the structure of an essentially hypertextualised story. The final objective is that students learn how a game may resemble a simulation that tries to model a phenomenon by isolating the essential features of that phenomenon and plays them out in a way that does not affect the phenomenon and ultimately the students are required to produce their own written phenomenon.

Syllabus: - history and development of games’ story development; - character development; - discourse analysis; - hypertextual narratology; - gaming as hermeneutical play; - game-states and rule definitions; - iteration, repetition and rapture; - Derrida’s “Structure, Sign and Play”; - game criticism, speculation and theory; - rules and metarules; winning conditions; - interactive fiction.

CS4075 - COMPUTER GAMES PROGRAMMING - TOOLS AND TECHNIQUES
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will provide students with a comprehensive introduction to event driven programming where a strong emphasis will be placed on practical application in at least two high level development environments. In addition, students will be introduced to multiprocessor support for event driven programs and shown how to improve event processing performance through parallel event transformation.

Syllabus: Imperative versus event driven paradigms. Introduction to GUI creation; graphical structures: frames, boxes, layout managers, menus, windows. Event handling process, event handling mechanisms: event classes, event sources, event listeners. The Delegation Model of event handling. Avoiding deadlocks in GUI code. Limits of message passing libraries and thread libraries. Event processing performance. Introduction to multiprocessor support for event driven programs. Techniques to improve event processing performance through parallel event transformation.

CS4076 - EVENT DRIVEN PROGRAMMING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will provide students with a comprehensive introduction to event driven programming where a strong emphasis will be placed on practical application in at least two high level development environments. In addition, students will be introduced to multiprocessor support for event driven programs and shown how to improve event processing performance through parallel event transformation.

Syllabus: Imperative versus event driven paradigms. Introduction to GUI creation; graphical structures: frames, boxes, layout managers, menus, windows. Event handling process, event handling mechanisms: event classes, event sources, event listeners. The Delegation Model of event handling. Avoiding deadlocks in GUI code. Limits of message passing libraries and thread libraries. Event processing performance. Introduction to multiprocessor support for event driven programs. Techniques to improve event processing performance through parallel event transformation.

CS4085 - COMPUTER GRAPHICS II - TOOLS AND TECHNIQUES
ECTS Credits: 6

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.

CS4091 - PROGRAMMING 1
ECTS Credits: 6

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; 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.
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).

CS4111 - COMPUTER SCIENCE 1
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To understand the mathematical basis of many complex computations, to lay 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, outfit, 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.

CS4115 - DATA STRUCTURES AND ALGORITHMS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To provide a uniform theoretical treatment of the data structures and algorithms used in systems and applications programming. This module includes a practical component to reinforce learning and to encourage students in the practical use of theoretical material.

Syllabus:
- Mathematics Review;
- Review of the ADTs, internals and usage of simple data structures and associated algorithms, in particular recursive algorithms;
- Linked Lists and Networks;
- Recursion, and the elimination of recursion from algorithms;
- Study of sorting algorithms: quicksort, heap sort, mergesort and bucket and radix sorting;
- Analysis of general divide-and-conquer algorithms;
- Searching: tree searching, AVL trees, splay trees;
- Graph algorithms: graph traversal and spanning forests, depth and breadth first search of graphs; connectivity; minimal spanning trees for weighted graphs; shortest path algorithms; networks.

CS4123 - INFORMATION MODELLING AND SPECIFICATION
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module serves to introduce the concepts that will be developed later on in the Systems Analysis and Design and Database Systems modules. Focusing on Data modelling, relational database languages and a formal specification notation, in particular using typed sets, n-ary relations and predicate logic, students are introduced to an integrate systematic approach linking system specification and implementation.

Syllabus: System development life cycle models.

Specifiation and implementation; verification and validation.
Modelling facts in terms of Predicates, Sets, Relations. The Relational Model of Data. Relations and Tuples. Relational Algebra: the 8 operators; Select, Project, Product, Join, Union, Intersection, Difference and Division.
Relational calculus. Tuple variables.
SQL, simple queries, conditions and expressions. Join queries and sub-queries.
Query nesting, Union and views in SQL.
Data analysis: attributes and values. Entities and relationships.
Entity relationship diagrams.
The Z notation, sets and types, schemas, predicates.
Invariants; pre and post conditions.
Specification using Z.
The schema calculus.
Database definition and manipulation in SQL.
Specifying database constraints Z.
Implementing database constraints in SQL.

CS4125 - SYSTEMS ANALYSIS AND DESIGN
ECTS Credits: 6

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.

**CS4158 - PROGRAMMING LANGUAGE TECHNOLOGY**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To provide students with an understanding of production systems, phrase structure generative grammars, the languages generated by these grammars, and the abstract state machines that elucidate the parsing process. To provide students with an understanding of how recognition/parsing programs can be systematically derived from grammars, especially by means of parser generators. To provide an understanding of the notion of syntax directed translation, and how it can be implemented in parser-based tools, especially applied to code-generation, and documentation of programs.

**Syllabus:**
- Notion of Phrase Structure;
- Notion of Post’s Production Systems;
- Chomsky’s definition of Phrase structure Generative Grammars, and Hierarchy of Grammars. Sentential Forms and Languages generated by Context Free Grammars;
- Regular expressions, Regular sets, and Regular Grammars;
- Classification of Abstract State Machines, Configurations, Transitions;
- Construction of Recognising Finite State machines from Regular Grammars and Cversely Program Design based on Regular Expressions;
- Construction of Lexical Analysers including use of Generators such as LEX/FLEX;
- Leftmost and Rightmost derivation of sentences from Context Free Grammars, Parse trees, and ambiguity of Grammars;
- Top Down Parsing (Recursive Descent) Techniques;
- Bottom Up (LR) Parsing Techniques;
- Notion of an Item, Closure of a set of Items, Transitions between sets of items, and canonical collections of valid items;
- Parser Generators such as YACC/BISON and their use in syntax directed translation.

**Prerequisites:** CS4111, CS4112, CS4411, CS4512, CS4013

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**CS4187 - PROFESSIONAL ISSUES IN COMPUTING**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** Information and Communication Technology (ICT) industries employ large numbers of people who create technologies affecting a wide range of different types of communities within society as a whole. It is very important that students who will be entering these industries do so with an understanding of ethical professional and cultural issues that they will need to engage with as professionals. To this end Professional Issues in Computing focuses on the ethical, legal and social consequences of the design, implementation and use of computer and information systems.

**Syllabus:**
- What is a computer professional?
- Ethical theories including: consequentialism and non-consequentialism; utilitarianism; deontological theory.
- Ethical decision making frameworks.
- Applying ethical theories to moral problems in ICT.
- Codes of conduct of professional bodies in ICT.
- Legal implications of being a professional including: Intellectual property law; privacy and data protection; computer crime; Irish, European and American laws and potential for conflict.
- Conflict between the legal and the ethical approaches.
- Social impacts of ICT including: Digital divide – exclusion based on: race, gender, age, language; North/South divide, power and democracy, unstoppable progress, physical and social disability.

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**CS4427 - SOFTWARE DESIGN AND ARCHITECTURE**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** The objectives of this module are to equip students with the fundamental knowledge and techniques necessary to design quality software at the object and component level. The emphasis is on the support of architectural use design through patterns at the architectural and design

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**CS4211 - COMPUTER ORGANISATION 1**
**ECTS Credits: 6**

**Computer Science & Information Systems**

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**CS4227 - SOFTWARE DESIGN AND ARCHITECTURE**
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** Students will gain a familiarity with the architecture, design and organisation of modern machines. Students will conduct basic arithmetic with decimal, binary, octal 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, PC and mainframe development;
- The representation of data: pure binary notation, binary operations, negative numbers, excess notation, BCD notation, fractions, floating point numbers;
- Hexadecimal and octal notation, inter-base conversions. ASCII and Unicode representation of symbols;
- Arithmetic: twos complement and floating point addition and subtraction;
- Concept of ‘levels’ in computer organisation: application, high level language, assembly language, OS, functional unit, digital logic;
- Translation of high-level language programs to the execution stage;
- Functional unit level: system bus model; memory hierarchies (register, cache, RAM, HDD); registers, CPU, ALU. Instruction fetch execute cycle;
- ISA Level: RISC and CISC architectures; examples of assembly language and translation to machine code;
- Introduction to Boolean algebra; AND OR NOT NOR NAND EXOR. truth tables, Venn diagrams. De Morgan’s law. dualities. logic gates: half and full adder;
- Introduction to PC and Play station architectures: word size, registers, CPU, RAM, multimedia;
- Networks and Internet: LAN topologies; protocols: TCP/IP, ICANN, domain names, Internet addressing. HTML;
- RFID Technology; passive and active RFID;
level, refactoring and Component Based Development (CBD) at both theoretical and applied level.

**Syllabus:** Topics presented include:
- Challenges facing the Object Oriented (OO) and Component Based Development (CBD) paradigms.
- Characteristics of good software focusing on modular decomposition, coupling, cohesion, interfaces, encapsulation and architecture centric component based development.
- Modelling of architectural use cases.
- Object Oriented Design (OOD) with a focus on extensibility and performance using a generic OO method in conjunction with the Unified Modelling Language (UML).
- Design of software architecture focusing on architectural patterns such as those presented in the volumes on Pattern Oriented Software Architecture series.
- Detailed design focusing on creational, structural and behavioural design patterns.
- Introduction to refactoring, code smells and refactoring to patterns.
- Component Based Development in theory and practice.
- Overview of topics such as Service Oriented Architecture, Domain Specific Languages etc.
- Comparison of OO versus CBD.

**CS4261 - FOUNDATIONS OF SOFTWARE TESTING**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** This module aims to develop practical knowledge of the theoretical concepts of software testing. This includes knowledge of people such as test designers, test analysts, test engineers, test consultants, test managers, user acceptance testers and IT Professionals. There is a growing need for software quality assurance skills in the medical devices sector. Lero and Continuing Professional Education have worked with the Irish Medical Devices Association in creating this course.

**Syllabus:** Risk Management in the Medical domain: e.g. ISO 14971
- Quality Management System (QMS) and the role of software Quality Assurance in this e.g.
  - FDA 21 CFR Part B20, Subpart C - Design Controls
  - EN ISO 13485 Quality Systems - Medical Devices
  - FDA and MDD regulations from a software development and software Quality Assurance perspective: e.g. IEC62304 and ISO 14971
  - Change Management in a Medical Device context
  - Current 'state-of-the-art' in medical software standards - including FDA, IEC, ISO, IRES, and GAMP standards

**CS4271 - SOFTWARE QUALITY ASSURANCE STANDARDS (MEDICAL DEVICES)**
ECTS Credits: 9

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** The programme will provide graduates with fundamental theoretical and practical skills, abilities and knowledge for assuring the quality of medical software applications in accordance with regulatory requirements and quality management systems. Graduates will be capable of creating and executing test cases and tracking software issues from their diagnosis to resolution and generally assuring the quality of developed software.

**Syllabus:**
- Introduction to the Visual Studio Integrated Development Environment (IDE).
- Introduction to web development using ASP.NET.
- Introduction to the technologies of electronic commerce. Web authoring and site development (HTML, CSS).
- Client/Server Architectures. Models of web applications.
- Introduction to the Business Computing Domain where an estimated 80% of all future deployment applications will include extensions to legacy COBOL programmes.

**CS4556 - BUSINESS ORIENTED PROGRAMMING LANGUAGES**
ECTS Credits: 6

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** This module is a prerequisite module for the Leveraging Legacy Applications module. It provides the foundations for that module by introducing students to languages and technologies required to work in the area of Legacy Systems. Additionally, by providing students with a working knowledge of COBOL, it equips them to work in the Business Computing Domain where an estimated 80% of all future deployment applications will include extensions to legacy COBOL programmes.

**Syllabus:**
- An introduction to the technologies of electronic commerce. Web authoring and site development (HTML, CSS).
- Client/Server Architectures. Models of web applications.
- Introduction to the Visual Studio Integrated Development Environment (IDE).
- Introduction to web development using ASP.NET.
- Introduction to the Business Computing Domain where an estimated 80% of all future deployment applications will include extensions to legacy COBOL programmes.

**CS4911 - INTRODUCTION TO INFORMATION TECHNOLOGY**
ECTS Credits: 6

**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 languages, HTML; proprietary software and Open Source Software.
- Hardware: types of computers, input/output devices, CPU, memory and secondary storage 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.

**CS4913 - BUSINESS INFORMATION SYSTEMS**

ECTS Credits: 6

**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 common 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 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.

**CU4121 - INTRODUCTION TO NEW MEDIA AND CULTURAL STUDIES**

ECTS Credits: 6

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 basics 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 develop students planing, 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 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.

**CU4128 - NEW MEDIA, LANGUAGE AND GLOBALISATION**

ECTS Credits: 6

School of Modern Languages and Applied Linguistics

**Rationale and Purpose of the Module:** To deepen students understanding of the interaction between language and technology, economics and politics in New Media; To explore the linguistic and sociolinguistic characteristics and consequences of New Media practices; To analyse these practices and their consequences at both micro and macro levels; To develop students critical skills.

**Syllabus:** This module focuses on the interaction between language, technology, economics and politics in the New Media. New media are understood here as media that are designed beyond the context of the nation state. The focus will be on satellites and digital broadcasting as well as the Internet, although reference will be made to other media, both traditional and new. The module will cover the following areas using a number of case studies against a theoretical background: The language and cultural politics of New Media (in terms of power relationships, ownership, representation, cultural bias etc.); multilingualism and New Media (how global media organizations respond to linguistic diversity; technical possibilities versus political-economic realities); the role of English as the globalizing language of New Media and the social, cultural and linguistic consequences of this; minority languages and New Media (the focus here will be on the Irish language and New Media).

**DA5001 - ETHNOCHOREOLOGY: HISTORY AND THEORY**

ECTS Credits: 12

Humanities

**Rationale and Purpose of the Module:** The primary objective of this module is to inform students of historical and theoretical perspectives of Ethnochoreology, an interdisciplinary subject which considers dance in its cultural context. This means examining the relevant
Rationale and Purpose of the Module:

ECTS Credits: 12

DA5111

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Syllabus: The history and development of ethnochoreological and dance anthropological theory; applications of anthropological perspectives in the discipline including: functionalist, symbolic, structuralist, linguistic, cognitive, practice and interpretive.

DA5101 - REPERTOIRE AND STYLE IN IRISH TRAD DANCE PERFORMANCE 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The objective of this module is to introduce students to the repertoires of diverse Irish traditional dance performance practices within a variety of theoretical, methodological and dance performance contexts. Students learn and embody types of Irish dance practices and their respective aesthetics from master tutors. This develops the performance skills of students and enhances their critical awareness and understanding of different performance practices and their respective aesthetic systems within the Irish dance tradition. Students will also learn research methods which they will apply to a dance ethnographic project of their choice.

Syllabus: Students will develop their knowledge of traditional dance repertoires and styles through practical, studio-based, dance workshops, performances and lectures; the history and development of different dance performance practices; contexts for the performance of traditional dance practices; aesthetic systems and related kinetic vocabularies; and research methods in dance including Labanotation, will inform their analytical perspectives of dance. The combination of theory and practice within the syllabus is designed for deeper understanding.

DA5111 - DANCE PRACTICUM 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The objective of this module is to provide students with appropriate knowledge and skills to create new work from an Irish traditional dance perspective. The module includes both a theoretical and practical dimension. Literature related to choreographic principles and dance are examined along with practical explorations of both Irish dance practices and modern dance techniques and forms. Students learn from, and collaborate with, choreographers in the creation of new work. This theoretical and practical approach provides a foundation from which students can extend their knowledge and abilities to choreograph new work.

Syllabus: The syllabus is structured to extend the students’ knowledge, skill and dance experience: practical dance technique and body awareness classes; theoretical and practical classes on the act of choreography and choreographic principles; analysis and critical evaluation of specific choreographed works (live performances and audio-visual material).

DA5141 - PRACTICUM 1 - DANCE PERFORMANCE REPETOIRE
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The aim of this module is to introduce conceptual frames and theoretical perspectives that support the creation and performance of contemporary dance choreographies and to support students to undertake research into performance-making, with a focus on creating work which is thought provoking and imaginative rather than safe and conventional. Throughout the module, each student will investigate a range of approaches towards creating and performing original performing set choreographies and improvisational scores.

Syllabus: The knowledge is structured according to the principles and practices underpinning history and tradition of Western Contemporary and Post-Modern dance techniques and performance. Its transmission is through live, text, video, DVD and studio-based, methods and modes of inquiry based on aesthetic, historical, cultural theories and concepts that have informed the development Western Contemporary and Post-Modern choreography and performance to date.

DA6021 - DANCE ETHNOGRAPHY

ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: The rationale for this module is to train students in appropriate methods and techniques in dance ethnography and to critically engage them in ethnographic documentation, representation and reflexive writing.

Syllabus: The objective of this module is to critically engage students in discourses surrounding ethnographic research methodologies in the field of ethnochoreology. These include issues relating to ethnography and ethnographic inquiry; cultural representation; documentation skills; and reflexive writing. Using appropriate ethnographic tools, students will produce a context-rich portfolio based on a firsthand experience in the field and subsequent critical reflection on the process.

DA6031 - CONTEMPORARY DANCE TECHNIQUES FOR PERFORMANCE 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: This module introduces theoretical practices and principles current with contemporary and post-modern dance performance research. It provides students with the opportunity to experience and critically examine, through study and practice, a range of contemporary/post-modern dance techniques and theoretical principles towards their clear articulation through movement in choreography and performance. Current techniques informing the study and practice of dance will be contextualized with reference to historically key movements in contemporary and post-modern dance and choreography.

Syllabus: The knowledge is structured according to the theoretical frameworks, principles and practices underpinning the history of Western contemporary and post-modern dance, choreography and performance. Its transmission is primarily through live studio-based research into the aesthetic, historical, and ideological principles that have informed the development of the field of contemporary and post-modern dance performance. The knowledge is also stored and transmitted through literature and text-based dance research, video, DVD documentation of the canon of works which define the tradition.
Design and Manufacturing Technology

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 spreadsheet modeling, but brief introductions to other modeling and optimization software will be given. Students will apply software modeling skills obtained here to subsequent topics.


Decision Making Under Uncertainty Introduce decision making under uncertainty. Introduce basics of simulation using spreadsheets. Introduce basic queuing and inventory models.

DM4017 - SIMULATION MODELLING AND ANALYSIS
ECTS Credits: 6

Design and Manufacturing Technology

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 modeling and software capabilities to apply simulation to manufacturing, logistic and services systems.

Syllabus: Introduction to simulation

Overview of simulation modeling, 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.

DM4027 - MEASUREMENT AND QUALITY SYSTEMS
(ENG)
ECTS Credits: 6

Design and Manufacturing Technology

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.


EC4003 - Intermediate Microeconomics
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This module builds on the introductory microeconomics module. It extends the analysis of producer and cost theory. It also extends the analysis of market structures (focusing on imperfect market structures) and introduces the issue of pricing and allocation of the factors of production. The latter part of the module looks at the economics of information and how choices are made under conditions of uncertainty. Finally, the student is introduced to the notion of general equilibrium and welfare. Using this framework, market failure and the rationale for government intervention (public sector) are examined.

Syllabus: 1) Theory of Production and Costs; 2) Models of Imperfect Competition and Game Theory; 3) Factor Markets; 4) The Economics of Information and Choice under Uncertainty; 5) General Equilibrium and Welfare

Prerequisites: EC4101

EC4004 - ECONOMICS FOR BUSINESS
ECTS Credits: 6

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 Ireland’s 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.

EC4027 - THE EUROPEAN ECONOMY
ECTS Credits: 6

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 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 macro economic 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 out 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
- The EU budget

**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 Growth Pact
- Euro and the Great Crisis
- Banking System and the Future of Euro Area

**EC4035 - ECONOMICS OF INTEGRATION**

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** The aim of this course is to analyse the theory and practice of economic integration and its impact on EU countries in a comparative framework (Asia). The rationale for economic integration, forms of economic integration, monetary integration are among the subjects that are discussed throughout the course.

**Syllabus:**
- Definitions and economic rationale
- Integration (economic ---)
- Vehicles of EI (trade, investment - financial investment, others)
- Stages of Economic Integration: from the Customs Union to EMU
- Economic motives for EI
- History of the 'European idea'
- Rationale for a 'historical' approach to EI
- The "United States of Europe" (an old idea)
- 'Triggers' of Integration in Europe

**Topic 2** Milestones in the process of (Economic) Integration in Europe
- Four broad milestones
- Political stage (Robert Schuman Declaration, May 1950)
- Economic stage (ToR to 1970s)
- Monetary/financial stage (from 1979)
- Political stage ... (from 1997), GFC
- Treaties (Euratom, ECSC, Rome... Lisbon)
- Ensuing policies
- Objectives of early treaties

**Topic 3** Institutions, economic policy making in the EU and budget
- 'Deep' versus 'shallow' integration (examples)
- EU Institutions
- Laws and Legislative process in the EU

**Topic 4** Theory of economic integration (1)
- Free trade versus autarky
- Tariff (economic impact of --)
- Two-country model (Customs Union theory)
- Trade creation and trade diversion effects
- Gains arising from integration in practice
- The 1992 programme (completion of the SEM)

**Topic 5** Theory of economic integration (2)
- Integration in factor markets
- Factor price equalization theorem
- Integration of capital markets (theory)

**Topic 6** Monetary Integration - Theory and practice
- Theory: Optimum Currency area
- Definitions
- Criteria (evolving ---)
- Costs and Benefits of an OCA
- Definitions (currency: international currency)
- Different types of exchange rate regimes
- Evidence (of monetary integration) - Monetary integration at world level:
  - The Bretton Woods system
  - Europe's snake in the tunnel

**Topic 7** Monetary Integration and Economic and Monetary Union (EMU) in the EU
- The European Monetary System
- The European Monetary System
- The Werner Report
- Delors Report and Maastricht Treaty
- Implications in terms of Fiscal policy - The Stability and Growth Pact
- Economic implications: the issue of 'asymmetric shocks'
- Conclusions: an assessment of EMU

**Topic 8** The 2008 GFC: first test on the resilience of the Euro-area
- The global financial crisis (GFC)
- Origin, causes and triggers
- Crisis contagion (through the Irish door...)
- Public debt crisis in the Euro-area
- Dealing with the crisis: short-term policy responses
The module aims to train 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.

**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. 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.
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.

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 isouquant and isocost analysis and traditional versus modern theories of costs 2) Models of imperfect competitive market structures and game theory 3) An analysis of Monopolistic Competition, Oligopoly and Duopolistic market structures 4) Labour demand and supply and 4) Pricing and allocating of the factors of production. 5) The macroeconomics section includes the following topics 5) Irish economic 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. 8) 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 ECB’s monetary policy in EMU.

Prerequisites: EC4101, EC4111, EC4102, EC4112

EC4333 - ECONOMICS OF EUROPEAN INTEGRATION
ECTS Credits: 6

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 Euro, a legal, political, economic, cultural, and soon to be 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. 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 out below. Workshops 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
&bull; Growth in Europe: Facts and Figures
Growth effects and factor market integration
&bull; Solow's Medium Term Growth Model

**Topic 3**
Trade Theory and the EU
&bull; Absolute Advantage
&bull; Comparative Advantage
&bull; Production Possibility Frontier
&bull; Standard Trade Model

**Topic 4**
EU Trade Policy
Trade Effects
&bull; Tariffs
&bull; Quotas
Welfare analysis of trade
&bull; Measuring consumers' and producers' surplus in an open economy

**Topic 5**
History and Future of the Common Agricultural Policy

**Topic 6**
Trade Theory and the EU
&bull; Absolute Advantage
&bull; Comparative Advantage
&bull; Production Possibility Frontier
&bull; Standard Trade Model

**Topic 7**
EU Trade Policy
Trade Effects
&bull; Tariffs
&bull; Quotas
Welfare analysis of trade
&bull; Measuring consumers' and producers' surplus in an open economy

**Syllabus:** The course begins with a review of the history and characteristics of the Irish economy in terms of its transition to relatively small closed economy to a regional economy with high levels of integration with the global economy. It covers recent demographic and labour market trends as well as distributional issues including poverty and income distribution. It proceeds to cover the policy and performance of the agriculture, services and manufacturing sectors. This is followed by the conduct of supply side policies such as competition and regulation policy. The course also covers the issues arising from the increased integration of emerging economies such as China as well as developing economies and the challenges posed by their development in terms of different aspects of sustainability including environment, trade and labour market issues.

**Prerequisites:** EC4101, EC4102

**EC4407 - IRELAND IN THE WORLD ECONOMY**

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** This course deals with important macro and micro economic issues and problems facing the Irish economy in the context of its status as one of the most globally integrated economies. The course covers characteristics of the economy such as demographic and labour market characteristics and distributional aspects. It also examines the principal sectors of the economy including agriculture, services and manufacturing. It emphasises the challenges posed by increased integration in the international economy including questions of immigration and environmental sustainability.

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

**EC4427 - MANAGERIAL ECONOMICS**

**ECTS Credits:** 6

**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, labor 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:**
- Introduction (Scope and Method of Industrial Economics, S-C-P paradigm...).
- Theories of the firm: Neoclassical and others
- Market Structure
- Structure and Strategy (Oligopoly Theory - Cournot and Bertrand duopoly models)
- Non price strategies
- Technological Innovation
- Barriers to entry in the case of the EU
- Performance of firms (performance indicators and performance of EU firms)
- A Case Study: the EU Banking Industry
- 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
ED5021 - DIGITAL ELECTRONICS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the C++ language and develop C++ programming skills.


ED5021 - C++ PROGRAMMING

ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To give students an introduction to many of the important hardware elements and topics in digital circuits.

Syllabus: The difference between digital and analogue signals Binary numbers (unsigned) and how they can represent an analogue signal Number systems and codes, Hexadecimal, ASCII code Simple ADC and DAC concepts Logic Gates: AND, OR and INVERTER gates and their truth tables Representing data in parallel and in serial form, RS232 Buses and addressing: the concept of selecting a device by decoding a number on an address bus Memory devices: basic types (NO internal workings) of semiconductor memory and how they are used LED displays: including single LEDs and 7-segment displays and how to drive them Modern Basics Sequential circuits: D-type flip-flops and registers; Counters and their applications; Shift registers in parallel to parallel conversion (and vice-versa); Simple state diagrams Mass Storage: Discs, Magnetic storage, sectors, data rates, Optical storage; Flash memory

ED5031 - SOFTWARE ENGINEERING
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To understand and apply the object-oriented approach to software development. To emphasise Good Software Engineering Practices. To enhance individual and team working skills via individual investigative project and presentation, individual exercises and a team project.

Syllabus: Object Oriented Analysis/Design: Object Oriented Paradigms (one in detail e.g. OMT/UML) focusing on architecture and behavioural design and representation. Use Cases. Design Patterns. Software Reuse. Overview of Object Oriented Programming Languages (e.g. Java/Smalltalk). Individual Project/Case Study. Team Project in the area of Software Design for


AC CIRCUIT ANALYSIS: How the ESB charges for the Energy that it supplies. Efficiency, Simple AC circuit analysis, Basic Filtering, Power Factor, Safety Issues.

EE4003 - THE ENGINEER AS A PROFESSIONAL
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The engineering profession demands more than just technical know-how and an engineering education must reflect this. To have a successful and rewarding career to and to properly reflect the importance of the engineering professional in society it is necessary to have technical knowledge as well as the ability to express ideas, to assume leadership, to operate within teams (sometimes interdisciplinary) and organisations and to make ethically considered decisions.

3. The Engineer as a Professional. Professions & The Engineering Profession, Professional Bodies, Life Long Learning & Continuous Professional Development.
4. Engineering Ethics, Engineers in Society, Responsibility in Engineering, Common Morality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways.

EE4005 - ELECTRICAL POWER SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

EE4011 - ENGINEERING COMPUTING
ECTS Credits: 6

Electronic & Computer Engineering

EE4015 - ELECTRICAL POWER SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

Generators/Alternators in power systems: steady state operation, transient conditions, unbalanced loading or faults, operation connected to infinite/non-infinite busbars, stability margin, operational limits, operation at leading power factor, governors and frequency control. Power Factor Correction: Single-phase and three-phase power factor correction. Utility and consumer power factor correction. Active power factor correction and filters.

Voltage Regulation: Voltage control standards: methods of voltage control, generator, reactive injection, series compensation, tap-changing, coordination of voltage regulation, voltage control and reactive power.


Transmission and distribution: Transmission line inductance, capacitance. Overhead lines, underground cables.

Fault analysis: Power systems faults: earth faults, line-line, line-line-earth; fault calculations, symmetrical faults, unbalanced faults.


Rectification, Inversion and High Voltage DC Systems.

Advanced Topics: Grid design, transmission and distribution systems, integrating renewable generation onto a grid, grid design for the future, smart grds.

EE4021 - GENERAL ENGINEERING
ECTS Credits: 3

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the students of the Engineering Choice programme to various disciplines of engineering, specifically related to the engineering programmes on offer in UL across five departments. This will broaden their curricula by learning about many areas of engineering. The students will be exposed to the fundamental principles of each discipline, the programmes of study and the career paths open to them upon graduation. Guest professional engineers will describe their experiences in their field of engineering. The students will therefore be empowered to make an informed choice as to their programme of study.

Syllabus: The students will learn about the fundamental principles of Biomedical engineering, Mechanical engineering, Computer Aided Engineering and Design, Aeronautical engineering, Civil engineering, Chemical and Biochemical engineering, Electronic and Computer engineering, and Design and Manufacturing engineering. Engineers need to be familiar with general engineering practice and with the particular practices of their discipline. Principal amongst these will be the methodology of design and operational practice within their discipline. Engineering is directed to developing, providing and maintaining infrastructure, goods, systems and services for industry and the community in a sustainable manner. It is important that graduate engineers are thoroughly versed in the engineering technologies relevant to their chosen discipline. Examples would include; telecommunications, power systems, control systems, algorithms, data structures, manufacturing processes, highway construction, aeronautical engineering etc. Students will also have the opportunity to become involved in multi-disciplinary projects which require them to draw upon technologies outside their immediate area of interest.

EE4023 - DISTRIBUTED SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

DISTRIBUTED PARAMETER CIRCUITS: Lossless transmission lines, derivation of wave velocity and characteristic impedance. Step propagation, reflection coefficient, multiple reflections, matched termination. Properties of selected lines, e.g., coaxial cable, PCB tracks, ribbon cable. (Sinusoidal response and SWR are covered elsewhere).

SYLLABUS:

LAPLACE TRANSFORM: Application of Laplace transform to circuit analysis, initial conditions, partial fraction decomposition, use of tables for inverse transformation, s and t shifting. Impulse and step response related to location of poles in s-plane, stability concept illustrated via feedback systems. Barkhausen criteria for oscillation. Geometric derivation of frequency domain response from pole-zero locations in s-plane.

COMPUTER SIMULATION: Use of appropriate package to model responses.


EE4027 - TELECOMMUNICATION NETWORK ARCHITECTURES 1
ECTS Credits: 6
Electronic & Computer Engineering

EE4115 - SYSTEMS ANALYSIS
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: To revise and develop student skills in the mathematical analysis of electronic problems.


Laplace Transform: Application of Laplace transform to circuit analysis, initial conditions, partial fraction decomposition, use of tables for inverse transformation, s and t shifting. Impulse and step response related to location of poles in s-plane, stability concept illustrated via feedback systems. Barkhausen criteria for oscillation. Geometric derivation of frequency domain response from pole-zero locations in s-plane.

Computer Simulation: Use of appropriate package to model responses.


EE4313 - ACTIVE CIRCUIT DESIGN 1
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: Introduction to Active Circuit Design and Analysis.


Prerequisites: EE4102

EE4407 - ASICS 1
ECTS Credits: 6
Electronic & Computer Engineering


Description of combinational and sequential digital systems in the Verilog or VHDL Hardware description language (HDL):

Test benches and verification using HDLs. Synthesizeable HDL constructs and inference of common digital structures.

CMOS digital circuit design.

The MOS transistor and long channel model. Parasitic capacitances. Introduction to the short channel model. The static CMOS inverter and its static and dynamic performance.

Static CMOS logic gates, composite CMOS gates and switch based logic.

CMOS latches and flip-flops for ASIC design.

Example common ASIC blocks: adders and multipliers.


EE4523 - DIGITAL SYSTEMS 2
ECTS Credits: 6
Electronic & Computer Engineering


Description of combinational and sequential digital systems in the Verilog or VHDL Hardware description language (HDL):

Test benches and verification using HDLs. Synthesizeable HDL constructs and inference of common digital structures.

CMOS digital circuit design.

The MOS transistor and long channel model. Parasitic capacitances. Introduction to the short channel model. The static CMOS inverter and its static and dynamic performance.

Static CMOS logic gates, composite CMOS gates and switch based logic.

CMOS latches and flip-flops for ASIC design.

Example common ASIC blocks: adders and multipliers.


EE6011 - CRYPTOGRAPHY AND SECURITY FUNDAMENTALS
ECTS Credits: 6
Electronic & Computer Engineering


Description of combinational and sequential digital systems in the Verilog or VHDL Hardware description language (HDL):

Test benches and verification using HDLs. Synthesizeable HDL constructs and inference of common digital structures.

CMOS digital circuit design.
Syllabus: Introduction to information and network security. Why security is an important issue. [Threats and vulnerabilities] Threats from passive and active attackers, such as: identity interception, masquerade, replay, data interception, manipulation, repudiation, denial-of-service, traffic-analysis, mis-routing and digital pests such as: trojan horse, virus, worms. [Security services, components and policies]. Security services such as: data confidentiality, data integrity and Email security. Security policies. Access control mechanisms. [Cryptography] Introduction of classical and modern cryptographic techniques and demonstration of the application of cryptography in the provision of security services. [Symmetric-key cryptography] Stream ciphers and classical Feistel-block ciphers. Examples such as: DES, IDEA, RC-5 and AES. [Introduction to Cryptanalysis] Cryptanalysis of classical ciphers and determination of cipher strength. [Public-key cryptography] The requirements of public-key cryptography. The intractability of factoring and calculating discrete logarithms. The RSA and El Gamal schemes and implementation issues. Elliptic curve cryptography. Identification and digital signature schemes. Zero-knowledge schemes. The DSA digital signature standard. Public key infrastructure. [Key management] Key distribution, key-sharing. Use of key distribution centres, authentication servers and certification authorities.

EE6031 - MULTIMEDIA COMMUNICATIONS  
ECTS Credits: 6  
Electronic & Computer Engineering  
Rationale and Purpose of the Module: Provides students with an understanding of applications and networking infrastructures used in communications for data in form of text, images, audio and video.


Routing and Internetworking operation. Internet and Internetwork protocols Transport level protocols Client Server Model Application Layer ISDN and B-ISDN The world-wide web. Multimedia applications

EE6411 - C++ PROGRAMMING  
ECTS Credits: 6  
Electronic & Computer Engineering  
Rationale and Purpose of the Module: To introduce the C++ language and develop C++ programming skills.


EE6421 - SOFTWARE ENGINEERING  
ECTS Credits: 6  
Electronic & Computer Engineering  
Rationale and Purpose of the Module: To understand and apply the object-oriented approach to software development. To emphasise Good Software Engineering Practices. To enhance individual and team working skills via individual investigative project and presentation, individual exercises and a team project.

EE6451 - DIGITAL SIGNAL PROCESSING  
ECTS Credits: 6  
Electronic & Computer Engineering  
Rationale and Purpose of the Module: To introduce the theory of digital signal processing, including the following very important topics: the discrete Fourier Transform, the Z-transform and digital filter design.


EE6461 - INFORMATION THEORY AND CODING  
ECTS Credits: 6  
Electronic & Computer Engineering  
Syllabus: Object Oriented Analysis/Design: Object Oriented Paradigms (one in detail e.g. OMT/UML) focusing on architecture and behavioural design and representation. Use Cases. Design Patterns. Software Reuse. Overview of Object Oriented Programming Languages (e.g. Java/Smalltalk). Individual Project/Case Study. Team Project in the area of Software Design for Advanced Communication Systems (e.g. Call Handling and Mobility Management Systems for the 3rd generation mobile system, UMTS).
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module aims to guide the student through the implications and consequences of fundamental theories and laws of information theory and to impart a comprehensive grounding in source coding, random and burst error protection coding theory with reference to their increasingly wide application in present day digital communications and computer systems.

Syllabus: Information Theory.

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EE6471 - ADVANCED DIGITAL SYSTEM DESIGN
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module aims to equip the student with a range of techniques applicable to the design and test of very high speed and fault-tolerant digital circuits.

Syllabus: Review: High-speed design in the time and frequency domains; re;ection, ringing and crosstalk, transmission lines. Transmission lines and termination strategies: Series, Thevenin, diode and AC terminations; Crosstalk, re;ections, ground bounce. Properties and behaviour of stripline and microstrip traces. Technology review: LVDS, ECL/PECL, GTL, SSTL, HSTL, and high-speed CMOS drivers and receivers; mixed voltage systems; bus;old and bus;olding considerations; hot insertion. Synchronous Design: Clock oscillators and buffering. Clock Distribution, Metastability. System Design and Manufacture: PCB materials; Layer build and speci;cation; Power supply considerations; Decoupling techniques.

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EE6621 - ASICS 1 (DIGITAL ASICS)
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module introduces issues relating to the design and implementation of application-specific integrated circuits (ASICs) for digital systems.


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EE6631 - TEST ENGINEERING 1 (PRODUCTION TEST SYSTEMS)
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The purpose of the module is to introduce the students to modern semiconductor integrated circuit (IC) test methods, including automatic test equipment (ATE), design for testability (DFT) and built-in self-test (BIST) for digital ICs.

Syllabus: The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The module will concentrate on IC designs, with the following key areas covered:

1. Semiconductor test overview: test points for semiconductor devices from wafer to package.
2. Test Engineering requirements.
3. Digital logic test concepts: sequential and combinational logic.
4. Memory test: - RAM and ROM.
5. Fault modelling and fault simulation.
6. Design for Testability (DFT).
7. Built-In Self-Test (BIST).
8. Problem with design complexity: System on a Chip (SoC) test problem.
9. ATE systems.
10. IEEE Standard 1149.1 (Boundary Scan).

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EE6641 - SEMICONDUCTOR TECHNOLOGY
ECTS Credits: 6
Electronic & Computer Engineering

Rationale and Purpose of the Module: This module introduces students to the fundamentals of VLSI manufacturing processes and technology.

Syllabus: IC Technology: Concept of die size and design rules; General overview of MOS and Bipolar technologies. Semiconductor Material: Crystal growth, defects and processing of silicon; alloying; epitaxial growth. Deposition: Atmospheric and low pressure chemical vapour deposition, polycrystalline and amorphous ?ilm deposition; evaporation; sputtering; properties of thin ?ilms: aluminium, refractory metals and silicides; Metalization; bonding; contacts; packaging. Oxidation: Kinetics of thermal oxidation, dry, wet, pyrogenic, HCI and TCE ambient properties of interface, LOCOS. Diffusion: P and N type impurities, Constant and limited source, annealing and diffusion in oxide; Gettering. Ion Implantation: process technique, trajectories. Lithography: Optical exposure and resist system, process characterization, mask making, wet and dry etching. Process Simulation: lithography, oxidation,
diffusion, etching. Process Integration: Overview of Bipolar, NMOS, CMOS and BiCMOS technologies, threshold control, latch up prevention, parasitics; SOI and SOS technologies.

**EH4001 - CRITICAL PRACTICE 1: ACADEMIC READING AND WRITING**
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to develop the skills of analysis and critical writing with a focus on literature(s) in English.

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.

**EH4003 - INTRODUCTION TO LITERARY THEORY**
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The aim of this module is unsettle accommon sense/E approaches to literature in English and to theorise the ways in which literature is produced, received and interpreted.

Syllabus: The module provides an introduction to literary theory, incorporating modes of analysis which emphasise the relationships of literature to issues of race, class, and gender. Though theory will be introduced historically, twentieth century literary theory will make up the core of the module. Students are encouraged to compare and contrast the various models of literary discussion presented during the course, and to think about how the following models might be applied to texts: Russian Formalism; 'new' criticism; reader-response criticism; psychoanalytic criticism; Marxist criticism; structuralism, post-structuralism, feminism, deconstruction, cultural materialism, new historicism, queer theory and post-colonialism.

**EH4007 - LITERARY MODERNISM**
ECTS Credits: 6

School of Culture and Communication

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).

**EH4013 - SENSIBILITY AND ROMANTICISM**
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module provides students with a survey of English literature of the eighteenth and early nineteenth centuries, a period in which literature was involved with, and inspired by, revolutionary political activity.

Syllabus: Inspired and subsequently alarmed by French and American revolutions, the writers of this period grappled with issues of race, slavery, gender, democracy, and republicanism. The module will begin with examples of the anxious introspection which characterises the poetry of sensibility; from this point forward is traced a shift from a negative and trivialising concept of the romantic towards the more complex Romantic cults of Nature and Imagination.

**EH4017 - CONTEMPORARY AFRICAN LITERATURE IN ENGLISH**
ECTS Credits: 6

School of Culture and Communication

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 literature (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.

**EH4023 - THE NEW WORLD: AMERICAN LITERATURE TO 1890**
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 example, 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.

EH4028 - STUDY OF A MAJOR IRISH AUTHOR
ECTS Credits: 6

School of Culture 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 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 Joyce's 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. Joyce's 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 Joyce's 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.

EH4043 - IRISH LITERARY REVOLUTIONS 1880 - 1930
ECTS Credits: 6

School of Culture and Communication

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 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.

EH4121 - GOTHIC LITERATURE IN IRELAND
ECTS Credits: 6

School of Culture and Communication

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.

EN4006 - CURRICULUM STUDIES
ECTS Credits: 6

Education & Professional Studies

Rationale and Purpose of the Module: Aim To situate whole curriculum in its macro educational and political context and develop students understanding of key aspects of curriculum planning, development, reform, innovation and change.

Syllabus: The definitions of curriculum as content and experience as well as hidden curriculum; the philosophical and ideological foundations of curriculum are considered from the perspectives of knowledge, society and the individual; the relationship between curriculum and education policy; external influences on curriculum policy and policymaking; partnership approach; recent curriculum policy developments; core curriculum; the work of the NCQA and their proposals for senior cycle reform; curriculum change, reform, innovation and development; curriculum design; key factors associated with the adoption, implementation, dissemination and evaluation of curriculum reform; impact of school and teacher culture on curriculum reform efforts; case studies of recent curriculum reforms e.g. ICT for teaching and learning; the pedagogy and assessment of the curriculum; purposes, modes and techniques of assessment; assessment for learning; contemporary national and international curriculum issues; some radical alternatives.

EN4033 - PLANNING FOR LEARNING
ECTS Credits: 6

Education & Professional Studies

Rationale and Purpose of the Module: This module requires students to take a detailed look at a variety of planning and teaching skills and concepts that combine to make a teacher effective in the classroom. Students are introduced to the complexities of planning and preparation for student-centred learning in preparation for their school placement in semester 4. A particular emphasis will be placed on planning, implementing learning strategies, assessment and evaluation of practice.

Syllabus: This module will introduce students to the various elements required to establish and maintain an effective/positive learning environment - communication (theory, skills and dynamics); the relational art of teaching; group dynamics. Students will be introduced to models of planning/curriculum models (product, process, subject-centred, learner-centred, problem-centred, Teaching Personal and Social Responsibility (TPSR) model); pedagogical/instructional frameworks (ARCS Model); instructional/practice frameworks (MRA, APPLE, ARC5); Integrative Model, Social Interaction Model, Inductive Model, Concept-Attainment Model, Concept-Development Model, Problem-based Model, Direct-Instruction Model); learning outcomes
EN4041 - CONTEMPORARY UNDERSTANDINGS AND THINKING ON EDUCATION  
ECTS Credits: 6

**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.

**Syllabus:** A brief overview of development of early influential thinkers in education exploring the core question what is education: Plato/Socrates (dialogic perspective); Descartes (enlightenment thinking and logical rationalism); Rousseau (Emile) exploration of modern thinkers that have influenced education Dewey (experience and democracy in education) Buber (on relationship); Frankyl (meaning making). An overview of schooling exploring the core question what is schooling; Illich (de-schooling society) Bourdieu & Lortie (cultural reproduction & deconstruction of the apprenticeship of observation) Freire & McLaren (critical pedagogy); Eisner (the art and appreciation of education) Greene (imagination and education); Sugrue (deconstructing lay theories of teaching); Lessing and Robinson (indoctrination and changing educational paradigms); Palmer (courage in teaching).

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EN4043 - UNDERSTANDING CLASSROOM PRACTICES  
ECTS Credits: 6

**Rationale and Purpose of the Module:** This module focuses on the development of knowledge, skills, and attitudes which will support student teachers in preparing for School Placement (SP) in the spring semester by developing their capacity to engage in and reflect upon effective planning, preparation and management of learning environments.

**Syllabus:** Students are provided with an introduction to the complexities of teaching to help students fulfill their role as facilitators of learning drawing upon Evidence Based Practice; Teacher as Researcher; Pedagogical Strategies; Classroom Management; Assessment for/of learning; benefits and limitations of using statistical analysis strategies to determine the effectiveness of pedagogical approaches. This module will help students to understand schools and the dominant teaching approaches that are used within them by looking at the history of Irish post-primary schools - educational provision in modern Ireland (school type; patronage/governance). The concept of the reflective practitioner will be central to this module where students will be given an introduction to the knowledge, skills and practices of reflection. The module examines the requirements of the Teaching Council and other bodies in relation to professional conduct, and child welfare issues.

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EN6161 - UNDERSTANDING LEARNING  
ECTS Credits: 6

**Rationale and Purpose of the Module:** The purpose of this module is to introduce students to different theoretical views of how people learn and the factors influencing this learning. Employing an evidence-based perspective, it aims to challenge the lay theories often associated with learning as a result of formal educational practices.

**Syllabus:** The purpose of this module is to provide students with a critical understanding of key topics in learning theory, examining behavioural, cognitive and constructivist theory. The role of motivation is also discussed and an introduction to learner differences is included. Several concepts, such as intelligence and learning style will be critically examined as part of this module. An introduction is given to the personal, social and emotional development of young people, including ways in which this impacts on the second level school. Students will reflect on their own learning and show an awareness of how their approach differs from that of others. Students will be introduced to key educational thinkers and will be expected to develop an initial outline of their own educational philosophy.

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EP4315 - ENTERPRISE FORMATION  
ECTS Credits: 6

**Rationale and Purpose of the Module:** The aim of the module is to provide participants with an understanding of the entrepreneurial process and the role of small firms in economic development. Students will also benefit from identifying the external and internal factors that impact on business start-up. Students are expected to prepare a feasibility analysis on a business idea to examine the viability of starting this business in a...
Syllabus: Mode of Instruction is lecture and tutorials workshops. Knowledge is structured in two main sections, theory and application of theory to real life economic conditions. Initially the concepts and factors affecting the entrepreneurial process are imparted to students, following which students work together in teams engaging in experiential learning in assessing the feasibility and viability of their business idea.

EP4407 - ENTERPRISE DEVELOPMENT  
ECTS Credits: 6

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.

EQ4025 - THE YOUNG HORSE  
ECTS Credits: 6

Life Sciences

Rationale and Purpose of the Module: The module provides 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.

EQ4027 - EQUESTRIAN FACILITIES  
ECTS Credits: 6

Life Sciences

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.

EQ4037 - PERFORMANCE RIDER DEVELOPMENT  
ECTS Credits: 6

Life Sciences

Syllabus: 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 practicise, 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.

**EQ4051 - INTRODUCTION TO HORSEMANSHIP**
ECTS Credits: 6

**Life Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to 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.

**ER4001 - ENERGY AND THE ENVIRONMENT**
ECTS Credits: 6

**Chemical & Environmental Science**

**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

**ER4101 - SYSTEMATIC ENVIRONMENTAL SCIENCE**
ECTS Credits: 6

**Chemical & Environmental Science**

**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.

**ER4405 - CONSERVATION ECOLOGY**
ECTS Credits: 6

**Chemical & Environmental Science**

**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 a biodiversity/E 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.

**ER4407 - ENVIRONMENTAL MANAGEMENT 1**
ECTS Credits: 6

**Chemical & Environmental Science**

**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.

**ER4417 - ENVIRONMENTAL IMPACT ASSESSMENT**
ECTS Credits: 6

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** Environmental impact assessment (EIA) is a key skill for environmental scientists, and forms the bulk of work undertaken by consultancy companies which employ many of our environmental science graduates. The module also provides a synthesis for environmental science students, in which it is made clear how their various modules in chemistry and biology are each relevant to the work of the environmental science practitioner. As EIA is linked to spatial planning, it is also of relevance to geography students. EIA is a process undertaken by many companies when they wish to establish to establish or expand, and is therefore of relevance to Business students with an interest in environment.
**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** To provide an understanding of the principles underlying waste water treatment.


**Prerequisites:** ER4507

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**ER4438 - ENVIRONMENTAL FATE MODELING**

**ECTS Credits:** 6

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** To provide the student with a scientific understanding of the important principles in relation to pollutant transport and degradation in the environment.

To facilitate the student in using both computational and computerised approaches to environmental fate modelling.

To facilitate the students' understanding of the role and relevance of environmental fate modelling in the prediction of environmental impacts and human/ecological risk.


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**ER4507 - EFFLUENT CONTROL - WASTE MANAGEMENT 1**

**ECTS Credits:** 6

**Chemical & Environmental Science**

**Rationale and Purpose of the Module:** To facilitate the students' understanding of the role and relevance of environmental fate modelling in the prediction of environmental impacts and human/ecological risk.

**Prerequisites:** ER4507

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**ER4627 - Safety and Industry**

**ECTS Credits:** 6

**Chemical & Environmental Science**

**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.

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**ER4707 - MONITORING AND RESEARCH METHODS**

**ECTS Credits:** 6

**Chemical & Environmental Science**

**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; sources; emissions impact assessment methods; primary/secondary/tertiary/quaternary systems. [Groundwater Pollution] subsurface environment, groundwater movement, sources of pollution, point sources; diffuse sources; microbial activity. [Pollutant transport in groundwater], non-aqueous phase liquid pollution (NAPL) / (DNAPL). [Groundwater Monitoring Wells] construction; design. [Sampling Groundwater] well depth measuring; well evacuation; 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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**ER4708 - BIOMETRICS**

**ECTS Credits:** 6

**Life 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.

ET4003 - ELECTRO TECHNOLOGY (ED)
ECTS Credits: 6

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, phototransistors, 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.

ET4008 - TEST ENGINEERING 2: DIGITAL CIRCUIT AND SYSTEM TEST
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The purpose of the module is to introduce the students to modern semiconductor integrated circuit (IC) test methods, including automatic test equipment (ATE), design for testability (DFT) and built-in self-test (BIST) for digital ICs.

Syllabus: The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The module will concentrate on IC designs, with the following key areas covered:-
1. Semiconductor test overview:- test points for semiconductor devices from wafer to package.
2. Test Engineering requirements.
3. Digital logic test concepts:- sequential and combinational logic.
4. Memory test:- RAM and ROM.
5. Fault modelling and fault simulation
6. Design for Testability (DFT).
7. Built-In Self-Test (BIST).
8. Problem with design complexity: System on a Chip (SoC) test problem.
9. ATE systems.
10. IEEE Standard 1149.1 (Boundary Scan).

Prerequisites: ET4015

ET4013 - COMMUNICATIONS NETWORKING FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide an introduction to data communications and networking. The module includes an overview of essential foundation topics and also introduces students to the internetworking principles and concepts.

Syllabus: Introduction to telecommunications: Definitions and concepts, standards bodies, communications tasks, protocol elements, characteristics and functions; reference communications models (OSI vs. TCP/IP). History/evolution of telecommunications networks. Physical Layer: Transmission modes and types; analog vs. digital signals; baseband vs. broadband; modulation/demodulation; 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). Network topologies (star, ring, bus, tree, mesh). Data link layer: Line disciplines (ENQ/ACK, poll/select); framing; frame synchronisation and data transparency, flow control; addressing; link management; protocol examples (HDLC, LAPB, LAPD, LAPM, PPP). Introduction to higher communications layers: Switching (circuit-, message-, packet-); routing (main types, concepts and principles), congestion control, QoS management, connection-oriented vs. connectionless transport services; segmentation and re-assembly; session management; data presentation; client-server model; internetworking principles and concepts (repeating, hubs, bridges, routers, gateways).

ET4015 - TEST ENGINEERING 1: PRODUCT DEVELOPMENT AND ATE SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To provide an insight into how commercial electronic systems are designed, manufactured and tested

Electronics Production : PCB Design. Through hole and Surface Mount Technology. How can production processes be made more reliable Lean Manufacturing Advanced Interconnection Systems for modern Electronic Production
ET4017 - COMMUNICATIONS NETWORKING STANDARDS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide further education in communications networks and provides detailed overview of the main international networking standards. The module also introduces students to modern communications standardised infrastructures and associated business models and paradigms.

Syllabus: 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), 802.5 (token ring), 802.11 (WFi), 802.1Q (VLAN), Metropolitan Area Networks (MANs): IEEE 802.16 (WiMax) standard.
Wide Area Networks (WANs): Frame relay: Asynchronous Transfer Mode (ATM), Multi-Protocol Label Switching (MPLS); Integrated Services Digital Networks (ISDN).
Modern communications business models and paradigms: Subscribers-centric model; consumer-centric model; integrated heterogeneous networking, infrastructural elements.

ET4023 - INTRODUCTION TO SECURITY AND CRYPTOGRAPHY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce fundamental concepts of information and network security. To introduce the ideas of threats and vulnerabilities such as viruses, worms, malware etc. To introduce fundamental ideas in cryptography. To place them in their historical perspective. To provide an appreciation of approaches to preventing such attacks.

Syllabus: [Introduction to information and network security:] Why security is an important issue.
[Threats and vulnerabilities:] Threats from passive and active attackers and from digital pests such as virus, worms and malware.
[Historical development of codes and ciphers:] Classical ciphers (Caesar, Vigener, one-time-pad etc.) Machine based codes: Enigma, Purple. Classical cryptanalysis (Bletchley Park, the Bombes etc.)
[Introduction to cryptography:] Basic approaches of symmetric key encryption. Block ciphers and stream ciphers. Basic approach of public key encryption.
[Introduction to key management. Application of ciphers.]
[Protection against attacks:] Introduction to security components such as firewalls and IDS, virus scanner, file integrity checker, OS update management. Role of passwords. Password cracking techniques.

ET4025 - NETWORK PROTOCOLS LABORATORY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To offer the students a learn-by-doing approach in communications and computer networks, for a better understanding of how networking technologies, mainly network protocols, operate in practice. Using appropriate laboratory facilities (real network equipment, protocol analysis software), the students will be allowed to observe, measure and experiment various communications protocols. It provides the student with a comprehensive coverage of computer networking and their protection, with a strong practical emphasis. At the completion of the module, students should have an understanding of the important issues in providing communications software for various types of computer networks. This includes LAN medium access protocols, WAN data link protocols and the TCP/IP protocol stack, mainly focusing on application protocols for file transfer, network management network security.

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. Layer 2 LAN protocols: Ethernet, token ring and FDDI: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames. WAN protocols: HDLC, frame relay, PPP: ATM: basic characteristics, frame types, fields and troubleshooting tips, capture and decode frames. TCP/IP protocol stack: IPv4 and IPv6, TCP and UDP: functions and PDU structure, protocol analysis, debugging tips; capture and reassemble PDUs, extract data. Client/server software used by TCP/IP protocols; design and implementation for client programs. Network management: SNMP case study. Network security: Using routers as firewalls, PGP case study.
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.

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**ET4077 - CLOUD COMPUTING**

ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the student to Secure Cloud Computing. This is to enable them to fully understand the Cloud, its vulnerabilities and how to offset them.


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**ET4087 - ELECTRICAL AUTOMATION**

ECTS Credits: 6

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, built environment and other domains.

This module replaces modules EE4207 - Industrial Automation, ET4315 Robotics 1: Industrial Automation and EE4057/EE4067 Electronics Systems for the Built Environment 1 on the BSc Electronics, and BSc Energy degrees. The modules have significant overlap and the change is to rationalise and update the modules. The purpose of this module is to equip students with the necessary skills to design, build and install automated systems in the built environment, in industry and elsewhere.


Prerequisites: ET4224

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**ET4111 - ELECTROTECHNOLOGY 1**

ECTS Credits: 6

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.

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**ET4121 - LABORATORY SKILLS 1**

ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to provide the students with the necessary basic laboratory skills in which to effectively undertake the necessary laboratory work within the course. The module will be based an introduction to the electronic engineering laboratory and the development of laboratory skills required within the course. This will be introduced within the laboratory environment and the emphasis is on building practical electronic hardware skills.

Syllabus: The module will consist of three main sections:-

1. Introduction to the electronic engineering laboratory:- codes of conduct, operation of test and laboratory test and measurement equipment:- power supply, signal generator, oscilloscope, circuit prototyping boards. Taking measurements (voltage, current, resistance, inductance, capacitance, frequency) and measurement equipment limitations.

2. Electronic circuit prototyping, build and test:- soldering, wire-wrapping, board design and layout, component choice and correct handling. Determining component values from the package coding.

3. Printed Circuit Board (PCB) build and test, working in a project group environment.

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**ET4132 - INTRODUCTION TO WEB AND DATABASE TECHNOLOGY**

ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module will introduce you to the concepts and techniques in web and database technology.
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)

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**ET4203 - ANALOGUE ELECTRONSICS 3**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** Introduction to structures of semiconductor devices and their use in basic amplifier circuits and systems.

**Syllabus:**
- Basic semiconductor diode: structure and operation
- Other forms of semiconductor diodes: diode, Light Emitting Diode, photodiode.
- Use of the diode: rectifiers in power supplies, amplifier circuits and systems.
- Transistors: transistor operation.
- Bipolar Junction Transistor (BJT): structure and operation of npn and pnp transistor.
- Metal Oxide Semiconductor Field Effect Transistor (MOSFET): Structure and operation of nMOS and pMOS transistor.
- Use of transistors in amplifiers: voltage amplifiers, amplifier class, analysis of amplifier operation.
- Power semiconductor devices: thyristor and triac.
- Data converters: ADC and DAC converters: architectures and operation.

**Prerequisites:** ET4141, ET4122

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**ET4253 - COMPUTER SYSTEMS ARCHITECTURE 2**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** To introduce students to advanced processor architectures and processing concepts, such as RISC, pipelining, and superscalar instruction execution. Students will understand the architecture of modern motherboards, internal buses, modern external interfaces, and interactions between application software, BIOS and device drivers.

**Syllabus:**
- Pentium and later microprocessors and simple RISC and CISC concepts;
- Protected Mode operation and relationship to Windows operating system;
- P4 incorporation of RISC techniques;
- Architecture of a modern PC, showing memory and bus hierarchies, use of caches in memory hierarchy; Legacy of ISA bus and Real Mode; Introduction to PCI and other internal PC buses.

Use of the BIOS in a PC and its relationship to application
programs and the operating system; The use of device drivers in a PC; I/O standards, including USB, IEEE 1394, serial and parallel interfaces; Disk and mass storage interfaces and standards; Video and graphics standards. Role of the Motherboard in a PC; Evolution of the PC. Project Work: Write simple programs to illustrate aspects of the PC architecture, detailed study of a PC motherboard, configuration of a PC, installation of an operating system on a PC.

Prerequisites: ET4142

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**ET4305 - INSTRUMENTATION AND CONTROL 1**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to the fundamental principles of practical control engineering, the use and specification of instrumentation and the use of a computer to instrument control systems and processes.


Prerequisites: ET4224, ET4204

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**ET4345 - OPERATING SYSTEMS 2**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** The prerequisite module, Operating Systems 1, introduces operating system concepts for uniprocessor systems. This module builds on the previous module by introducing a specific operating system, UNIX, and covering the underlying design and implementation features of the UNIX operating system. A set of laboratory exercises exposes the student to the internals of the UNIX operating system.

**Syllabus:** UNIX Overview: History, standards, shells, interfaces. UNIX architecture: Features, partition of functions and position in the layered structure. Kernel organisation: Control flow, execution, daemons, timers, interrupts, clocks, modules. Process Management: Process manager, system calls, task creation, blocking, wait queues, scheduling, IPC, booting. Memory management: Virtual address space, secondary memory, shared memory, addressing, performance issues, system calls. File management: File I/O, file access, different file systems, performance issues, system calls. Device management: Device drivers, streams, interrupt handling, disk drive example. Laboratory: A set of laboratory exercises based on skeleton example programs will guide the student through the internals of the UNIX operating system. The example programs will be developed in shell scripts and C/C++ programming environments.

Prerequisites: ET4725

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**ET4407 - ELECTRONICS AND THE ENVIRONMENT**
ECTS Credits: 6

**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. 2. Design for Environment (ECO Design): Life cycle chain analysis, design for recycling, reverse manufacturing, reverse logistics, end of life solutions. 3. Green materials: lead free interconnects, halogen free materials, all other materials outlined in WEEE and ROHS, packaging. 4. Sustainability, energy efficiency, alternative power supply. 5. 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. 6. Invited talks: Seminars by the local electronics industry on environmental challenges in their company.

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**ET4437 - DISTRIBUTED COMPUTING AND JAVA**
ECTS Credits: 6

**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.

Access Protocol (SOAP).
Major programming project.

Prerequisites: ET4355

ET4725 - OPERATING SYSTEMS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides an introduction to multi-tasking operating system concepts. Topics include: processes, threads, memory management and file systems. Focus is on a single processor machine. The module will include a laboratory project.

Syllabus: Operating System: Definitions, types of operating systems.
Processes: Concurrency, states, queues, scheduling, threads.
Interprocess communication and synchronisation: Mutual exclusion, race conditions, busy-waiting solutions, TSLs, semaphores, monitors, simple message passing, classical problems.
Deadlock: Conditions for deadlock and solutions.
Memory Management: Swapping, virtual memory, paging and segmentation.
File systems to support multi-tasking: Disk organisation, space management, file sharing, file protection, performance issues.
Laboratory: The students will become familiar with one operating system: UNIX or Microsoft Windows. Exercises will involve: shell scripting, system calls using C/C++, solving synchronisation problems in a concurrent programming environment..

Prerequisites: ET4253, ET4263

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EV4003 - EQUINE FEEDING AND BEHAVIOUR
ECTS Credits: 6

Life 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, ontology 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.

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EV4005 - GRASSLAND AND GRAZING MANAGEMENT
ECTS Credits: 6

Life 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
2. Soil formation
3. Physical and chemical properties of soil
4. Soil fertility
5. Lime and pH
6. Major and minor elements in soil
7. Fertilisation in horse pastures
8. Grass growth
9. Reseeding of pastures
10. See mixtures
11. Grazing management
12. Hay production
13. Silage production
14. Poisonous plants
15. Racing track management

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EV4012 - EQUINE ANATOMY AND PHYSIOLOGY
ECTS Credits: 6

Life 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.

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EV4023 - EQUINE HEALTH AND ENVIRONMENTAL MANAGEMENT
ECTS Credits: 6

Life 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.
EV4025 - EQUINE BREEDING AND GENETICS
ECTS Credits: 6

Life Sciences

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.

FI4003 - FINANCE
ECTS Credits: 6

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.

FI4005 - ADVANCED CORPORATE FINANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: This course builds on the core module, Finance, to provide students taking the accounting and finance major option of the BBS with a good grounding in corporate finance, and its application to share valuation and the decisions of corporate financial managers.

Syllabus: The course builds on the discounted cash flow techniques learned in the earlier core module, and covers more advanced capital budgeting, taking into account inflation, uncertainty and tax. Simulation and scenario analysis are covered. The concept of a real option is introduced. 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. The students are introduced to the capital markets, and the main approaches to share valuation are discussed and contrasted. Ideas around socially responsible investment are debated and critiqued. Mergers and acquisitions are evaluated.

Prerequisites: FI4003

FI4007 - INVESTMENTS: ANALYSIS AND MANAGEMENT
ECTS Credits: 6

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

FI4407 - FINANCIAL INSTITUTIONS AND MARKETS
ECTS Credits: 6

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: FT4003

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**FT4305 - FOOD ENGINEERING PRINCIPLES**  
ECTS Credits: 6  

**Life 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.


Prerequisites: PH4022

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**FT4345 - FOOD PROCESSING OPERATIONS**  
ECTS Credits: 3  

**Life Sciences**

**Rationale and Purpose of the Module:** To refocus the programme 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. 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.

Prerequisites: FT4204, FT4305

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**FT4355 - ADVANCED NUTRIENT METABOLISM AND HEALTH**  
ECTS Credits: 6  

**Life 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 potential health benefits. It will provide a comprehensive understanding of the aetiology and management of nutrition-related disorders in the clinical setting.

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.

Prerequisites: BY4214

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**FT4365 - FOOD, HEALTH AND DISEASE**  
ECTS Credits: 3  

**Life 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. Maillard-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.

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**FT4421 - INTRODUCTORY FOOD SCIENCE AND HEALTH**  
ECTS Credits: 6  

**Life Sciences**

**Rationale and Purpose of the Module:** To provide an introductory course in food science and technology, highlighting the linkages between food and health.

**Syllabus:** An overview of food science and its relationship to human health.  
A 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. Maillard-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.
FT4437 - MILK PROTEINS AS FOOD INGREDIENTS  
ECTS Credits: 6  

Life Sciences  
Rationale and Purpose of the Module: To provide students with an advanced understanding of the role of milk proteins as food ingredients.  


FT4447 - FOOD QUALITY  
ECTS Credits: 3  

Life 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.  


Prerequisites: FT4204, FT4325

FT4457 - RESEARCH TRENDS IN HEALTH AND FOOD

ECTS Credits: 3

Life 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 to 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)  
- Nutraceuticals (Hypotensive peptides, peptides and cognitive function)  
- Neutrigenomics (Diet and gene interactions)

Prerequisites: FT4335

GA4105 - IRISH FOLKLORE 1  
ECTS Credits: 6  

School of Culture 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

Prerequisites: GA4105

GA4115 - IRISH LANGUAGE 1  
ECTS Credits: 6  

School of Culture and Communication

Rationale and Purpose of the Module: The course aims to provide the student with a strong basic knowledge of Irish. It introduces students to the history of the Irish language and to early Irish literature. The course is designed to:

- Enable the student to understand and use basic structures of Irish grammar.
- Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with Irish speakers.
- Foster autonomous language learning skills.
- To develop listening and speaking skills in Irish.

To equip the student with basic writing skills.
Syllabus: Language element: This is an introductory course. Topics covered include: Meeting people, background and place of residence, the family, the house and accommodation, pastimes, daily life and talents and skills. Gaeltacht regions and certain dialect features will be discussed and some of the many Irish-language materials and resources available online will be explored.

Note: The language syllabus of this course has been developed by NUI-Maynooth and follows the guidelines established by the Council of Europe/ES Common European Framework of Reference for Languages. Those who continue with module GA4116 in the spring semester will gain enough practice with the language to sit the A1 level European Certificate in Irish, known as Teastas Eorpach na Gaeilge. The certificate examination is completely voluntary and is not administered by the University of Limerick, but does give the student an internationally recognized qualification in Irish. Please see course tutor if you would like more details.

Lectures / Léachtaí: Lectures will cover the history of the Irish language and early Irish literature. Topics include the genetic relationship between Irish and other European languages, particularly other Celtic ones, and trace the development of the language from its primitive ancestor through to Old, Middle, and Early Modern Irish. A survey of early Irish literature will include selected works from Old, Middle, and Early Modern Irish. A number of important figures in the development of Irish literature will be discussed and some of the many Irish literary works will be examined.

ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go dtiocfadh na mic léinn ar an Ghaeilge a bháisniú agus a chur i bhfeidhm i nádúrtha i réimse leathan ábhar, agus go háirithe i réimse aithne ar litríocht chomhaimseartha na Gaeilge.

Syllabus: Go dtabharfadh na mic léinn le litríocht na Gaeilge duitse: go léirfeadh an mic léinn na nádúrtha i réimse leathan ábhar, go bhfuil an mic léinn anáin nádúrtha i réimse leathan ábhar.

ECTS Credits: 6

School of Culture and Communication

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ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go dtiocfadh na mic léinn ar an Ghaeilge a bháisniú agus a chur i bhfeidhm i nádúrtha i réimse leathan ábhar, agus go háirithe i réimse aithne ar litríocht chomhaimseartha na Gaeilge.

Syllabus: Go dtabharfadh na mic léinn le litríocht na Gaeilge duitse: go léirfeadh an mic léinn na nádúrtha i réimse leathan ábhar, go bhfuil an mic léinn anáin nádúrtha i réimse leathan ábhar.

ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Go dtiocfadh na mic léinn ar an Ghaeilge a bháisniú agus a chur i bhfeidhm i nádúrtha i réimse leathan ábhar, agus go háirithe i réimse aithne ar litríocht chomhaimseartha na Gaeilge.

Syllabus: Go dtabharfadh na mic léinn le litríocht na Gaeilge duitse: go léirfeadh an mic léinn na nádúrtha i réimse leathan ábhar, go bhfuil an mic léinn anáin nádúrtha i réimse leathan ábhar.

ECTS Credits: 6
School of Culture and Communication

Rationale and Purpose of the Module: Réasúnaíocht Is í an aidhm atá leis an modul seo ná a chur chur chumas an mhic léinn déileáil le riachtainí tharlaí, an cheoil agus feasaacht ar an nGaeilge mar cheann de bhun-fhoinn an cheoil traidsiúin a fhorbairt agus a chothú. Díreofar ar chomhtháclaíonn a bhíteáil a bhí le haghaidh na trasnaíneachtaí agus an cheoil, ag agallaimh agus raidióidí. Chuige déanfar forbaistí ar na scileanna éisteachta, labhartha, léitheoireachta agus scribhneoireachta seacht agus déanfar saolthar le huraidh na mic léinn.

Syllabus: Síollabas

Cursios ar thaisc a bhaint go hárthar ar thaisc cheoil an mhic léinn, saolthar a bhaineann le huiríse leisleis, leis an seúisí agus leis an múineadh an cheoil, scileanna cur í láthair, script raidió do cheoil, filmeanna, scannálaíocht comhaimseartha, go dtí seo; téarmaíocht an cheoil traidisiúnta, cláracha tellifisí agus raideáite, scribhneoireachta, chomhainmeartha, abhár cios-amharc agus abhár ón idirlíon.

Prerequisites: GA4161

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GE4143 - GERMAN LANGUAGE AND SOCIETY 3: LIVING AND WORKING GER
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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 develop students' skills in the analysis of more complex literary texts in German.
To provide students with the skills to do a presentation in the foreign language
To further consolidate grammatical structures, extend vocabulary and increase accuracy in oral and written German.

Syllabus: 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 programmes dealing with the issues covered in the lecture.

Prerequisites: GE4142

GE4147 - GERMAN LANGUAGE AND SOCIETY 5:GERMANY EUROPE AND BEYOND
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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 inter-cultural 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: 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 focussing on German/English translations.

Prerequisites: GE4146

GE4211 - GERMAN FOR BEGINNERS 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide students with an introduction to the German-speaking countries as physical, cultural and political entities.

Syllabus: 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.

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: 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.

Prerequisites: GE4212

GE4241 - GERMAN LANGUAGE, CULTURE AND SOCIETY 1
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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

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 programmes dealing with the issues covered in the lecture
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.

GE4243 - GERMAN LANGUAGE CULTURE AND SOCIETY 3
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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 textbook 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.

GE4247 - GERMAN LANGUAGE CULTURE AND SOCIETY 5
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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.

GE4621 - GERMAN LITERATURE AND CULTURE 1: INTRODUCTION TO GERMAN LITERATURE
ECTS Credits: 6

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 literatures 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.

GE4623 - GERMAN LITERATURE AND CULTURE 3: ROMANTICISM
ECTS Credits: 6

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 in particular on its socio-historical background. To examine the legacy of Romanticism in the 19th and 20th centuries.

Syllabus: Lecture: critique of the enlightenment; the preromantics (Sturm und Drang); romanticism in Europe; romanticism in art and literature; political romanticism, particularism and nationalism; Young Germany, Vormärz, 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-Fouquë, 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.

GE4627 - GERMAN LITERATURE AND CULTURE 5: ASPECTS OF 20TH CENTURY LITERATURE
ECTS Credits: 6

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 which may be considered include literature and cultural identity, the role of literature in political change, the writer as social critic and women's writing.

GE4921 - GERMAN FOR BUSINESS 1A
ECTS Credits: 6
Rationale and Purpose of the Module: 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 familiarise students with culture and history of the German-speaking countries. To introduce students to learning strategies and multimedia facilities in language learning.

Syllabus: 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.

GE4923 - GERMAN FOR BUSINESS 3A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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: 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: 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) Prerequisites: GE4922

GE4925 - GERMAN FOR BUSINESS 5A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide a general introduction to researching business subject matters in German. To consolidate existing language skills and familiarisation with the language of marketing, economics, human resources, insurance and accounting. To prepare students for Cooperative Education.

Syllabus: Lecture: Focus on the different specialisations 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

GE4927 - GERMAN FOR BUSINESS 7A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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 inter-cultural 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: 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, focussing on German/English scientific, economic and journalistic texts. Prerequisites: GE4925

HI4043 - EUROPE: ENLIGHTENMENT AND REVOLUTION 1688 - 1815
ECTS Credits: 6

History

Rationale and Purpose of the Module: The aim of this second year module is to provide an overview of British and European History in the eighteenth and early nineteenth centuries. The period will be examined from two angles: (1) chronologically, so that students will attain a grasp of the progression of events from the death of Louis XIV and the partition of the Spanish Monarchy, through the European revolutions of the late eighteenth century to the rise of the modern nation states in the nineteenth century; and (2) thematically, where we will be examining different aspects that were characteristic of the period in question, such as the Scientific Revolution and the Enlightenment; liberalism and nationalism; industrialisation and the emerging role of mass movements. By the end of the module, students will have improved their skills of analysis and written expression, and they will have acquired a critical perception of how modern Europe was born from the rubble of the Old Regime.

Syllabus: The decline of belief in witchcraft and the scientific revolution; the emergence of Russia as the leading power in eastern Europe; Europe at peace, 1715-1740; the expansion of Britain as a world power; the Enlightenment and its impact on economy, society and politics; the Enlightened absolutists: Joseph II and Catherine the Great; Spain in the eighteenth century; the rise of Prussia and the diplomatic revolution of 1756; the role of women at the court of Louis XV; the collapse of the Old Regime in the 1780s; the French revolution; European radicalism in Britain, Poland and the Low Countries; Napoleonic Europe; the Congress of Vienna and the balance of power in the early nineteenth century; reaction, conservatism and romanticism,
1815–1830; social and parliamentary reform in Britain and France after 1815; Austria in the age of Metternich; the revolutions of 1848.

HI4053 - IRELAND: 1750 - 1850
ECTS Credits: 6

History

Rationale and Purpose of the Module: The aim of this module is to provide an introduction to Ireland during the period 1750-1850 in three interrelated sections: economies, societies and cultures, political and civil societies.

Syllabus:

I ENVIRONMENTS AND ECONOMIES
1 wind, rain, soil
2 time and place
3 diet: cattle, grain, roots
4 regional ecologies, economies and cultures
5 growth and crisis; land, wages, prices, trade
6 demographic transitions: births, deaths, migrations
7 infrastructures
8 the 1850 economy

II SOCIETIES AND CULTURES
1 rural social structures: landownership, farming, labour
2 the cult of improvement
3 household; gender, sexuality and patriarchy:
4 urban society: merchants, trades, mendicants
5 the languages of Ireland: Anglicisation 1750-1850
6 belief and faith

III POLITICAL AND CIVIL LIFE
1 the constitution: king, lords and commons of Ireland
2 constituencies and franchises
3 parties, patriots and politics
4 agrarianism
5 the tree of liberty and the rights of man
6 making and breaking the union

HI4117 - THE IRISH CONFLICT, 1948 - 98
ECTS Credits: 6

History

Rationale and Purpose of the Module: To provide students with a comprehensive grasp of the origins and nature of the 'Irish Troubles' from the birth of the Irish Republic to the 'Good Friday Agreement'. The course traces the evolution of the political crisis in both Irish jurisdictions, with reference to the British perspective. Themes will include the Anti-Partition League, Clann Na Poblachta and the United Nations; Saor Uladh, Sinn Fein and the IRA during the 'Border Campaign'; Unionism and Loyalism; Cathal Gouliod and the move to the Left; special powers and civil rights; Official and Provisional IRA; 'Bloody Sunday' at home and abroad; counter-insurgency in the two jurisdictions; Long Kesh, Portlaoise and Wakefield; Ulster Defence Association, Ulster Volunteer Force, Red Hand Commando and Ulster Resistance; Saor Eire, Irish National Liberation Army, Irish Republican Socialist Party and Irish People's Liberation Organization; The Hunger Strikes, 'Ulsterization' and the 'Long War'; Section 31, propaganda and 'D notices'; Foreign Affairs, the White House and United Nations; Abstentionism, rise of Sinn Fein and the origins of the Peace Process.

Syllabus: The course is divided into seminars which address key concepts, events and dynamics of the period. The student will learn to assess the role of such organizations as the Anti-Partition League, Saor Uladh and Sinn Fein in relation to the partition issue. Other themes of the module include Unionism and Loyalism, special powers and civil rights, Official and Provisional IRA, 'Bloody Sunday', counterinsurgency, Long Kesh and paramilitary imprisonment, Hunger Strikes, 'Ulsterization' and 'The Long War', Section 31, and the origins of the Peace Process.

HI4012 - SOURCES FOR HISTORY
ECTS Credits: 6

History

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 gaining 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:
1 Historians and their sources: a brief history
2 Primary and secondary sources
3 Identification, location, accession, critical evaluation and use of sources
4 Public and private archives: origins, ideologies and holdings
5 Using archives: access, availability, procedure and professional practice
6 The range and scope of electronically available source materials
7 Audio and visual sources
8 Old histories and new histories
9 Forgery, fabrication and the historian
10 The withdrawal, suppression and destruction of sources
11 Professional practice and political necessity
12 Appropriate citations of primary and secondary sources
13 Presenting a small research project

HI4061 - REFORMATION AND THE MODERN STATE: EUROPE IN THE SIXTEENTH CENTURY
ECTS Credits: 6

History

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 century. It is intended as a gradual introduction for first-years into the early modern period, and covers a shorter and more manageable time-frame than the previous practice of teaching two centuries in one semester.

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; diet, demography and disease; a society of estates - nobles, clergy, merchants and peasants; family life - birth, marriage and death; Charles V, Francis I and the Habsburg-Valois conflict; Luthers protest and the Evangelical movement in Germany and Scandinavia; Calvin and the second Reformation; capturing the hearts and minds of the ordinary people - preaching and literacy; the response of the Catholic Church - Jesuits, the Council of Trent and the alliance of Church and State; Wars of Religion in France and the Netherlands; Philip II and Spanish world hegemony.
HI4127 - UNDERSTANDING THE HOLOCAUST IN 20TH CENTURY EUROPE  
ECTS Credits: 6  

History  
Rationale and Purpose of the Module: The aim of this module is to provide advanced students with the opportunity to further develop their analytical and research skills through a study of a significant historical issue, namely, the Holocaust/Shoah, in the middle decades of the twentieth century.  

Syllabus: Jews in inter-war Germany and Europe; war and the racial reordering; everyday life under the Occupation and in the ghettos; deportations; hierarchies of power in the camps; perpetrators; surviving the Holocaust & co-optation and resistance; opening the camps & reconstructing Holocaust experiences; the Holocaust and historians; the victims’ experience and its legacy for contemporary society; interface between the Nazi espousal of eliminationist biology and the motivation of perpetrators; politics and law; victims’ varied reactions in the context of national and local communities; national, communal and individual bystanders; recovering Holocaust experiences.  

HI4147 - IRELAND AND THE USA, 1790 - 1960; A SPECIAL RELATIONSHIP?  
ECTS Credits: 6  

History  
Rationale and Purpose of the Module: The module is offered as an elective seminar module to year four BA English and History, BA History, Politics, Sociology and Social Studies and eventually BA Arts (history students). It is an opportunity for students who have chosen the module, to study the theme in an in depth way. Secondly, the purpose is to sharpen the student/Es critical skills, through discussing ideas, events and individuals that retain contemporary resonance  

Syllabus: Irish emigration - the first wave; the appointment of a US consul in Ireland; Irish-American economic links in the nineteenth century; the impact of the 1845-51 famine on the relationship; Ireland and the US civil war; managing the second emigrant wave and Irish-American; the US and revolutionary Ireland, 1916-22; De Valera and F.D. Roosevelt’s relationship; economic and social ties in the inter-war period; David Gray, De Valera and World War Two; Ireland and the Marshall Plan, 1947-57; Irish and US diplomatic relationship, 1951 to 60.  

HI4207 - THE FIRST GLOBAL EMPIRE: THE SPANISH MONARCH, EUROPE AND AMERICA 1479 - 1598  
ECTS Credits: 6  

History  
Rationale and Purpose of the Module: This module is intended as a research-based elective module for final-year undergraduate students. It will build on the success of previously offered elective modules on early modern history by giving students a thematic and chronological overview of the history of Spain and America that is specific to the late medieval period and the sixteenth century. As such, it responds to the very positive student feedback that was received for the old HI4062 module on Court Politics and Culture in Early Modern Spain, 1561-1665.  

Syllabus: The dynastic union of Castile and Aragon; the inheritance of Charles V; strengths and weaknesses of a composite monarchy; conquest and colonisation of an empire in America; Francisco de Vitoria and the School of Salamanca; the Habsburg-Valois wars in Italy; the establishment of professional conciliar government; the emergence of Madrid as a capital city from 1561; El Greco and the urban decline of Toledo; the conflict against the Ottomans in the Mediterranean; development of an Atlantic economy based on Seville; Church, Inquisition and popular spirituality; construction of the Escorial; faction, court ceremony and the politics of access to the ruler; the religious wars of the later sixteenth century; Alonso Sánchez Coello and Spanish court portraiture; Philip II as Prudent King and secular right arm of the Counter-Reformation, 1559-98.  

IN4003 - PRINCIPLES OF RISK MANAGEMENT  
ECTS Credits: 6  

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.

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**IN4005 - RISK ANALYSIS**
ECTS Credits: 6

**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

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**IN4007 - GOVERNANCE AND RISK**
ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:**
To develop in the student an understanding of and insight into the concepts of governance and risk. 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.

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**IN4015 - RISK AND INSURANCE**
ECTS Credits: 6

**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.

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**IN4427 - INSURANCE ORGANISATIONS AND MARKETS**
ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:**
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:**
The students will gain a general understanding of insurance organisations and markets and produce some in-depth analysis.

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**IN4725 - RISK AND INSURANCE**
ECTS Credits: 6

**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. With the spiralling cost of health care and the changing...
demographic in Ireland and Europe there is significant focus on the health care market by the state and the insurance industry. This module will introduce students to

**IN4735 - INSURANCE ORGANISATIONS**
ECTS Credits: 6

**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.

**Syllabus:** The students will gain a general understanding of insurance organisations and markets and produce some in-depth analysis.

**JM4008 - INVESTIGATIVE JOURNALISM**
ECTS Credits: 6

**School of Culture 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 face 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 student/Es contributions to the final project.

**LA4001 - LEGAL SYSTEM AND METHOD**
ECTS Credits: 6

**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.

**LA4005 - LEGAL ENVIRONMENT OF BUSINESS**
ECTS Credits: 6

**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.

**LA4011 - INTRODUCTION TO LAWYERING 1**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** The aim of this module is to provide a detailed understanding of the operation and practice of the legal system in Ireland, paying particular attention to the necessary skills inherent in the process of law at all levels. It forms part of a sequential number of modules within which this aim is achieved.

**Syllabus:** The objective of this module is to ensure that upon successful completion, students have a detailed knowledge of the legal process, including an introduction to court structure and procedure, the doctrine of precedent, statutory interpretation and legal research and writing. The syllabus will focus extensively on self-directed learning and active exercises. In addition, students will be expected to explore the role of law in society, paying particular attention to its jurisprudential underpinnings.

**LA4013 - MEDIA LAW**
ECTS Credits: 6

**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 in particular 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, and 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.

LA4021 - CHILD LAW
ECTS Credits: 6

Law
Rationale and Purpose of the Module: The desire to protect children from harm and to recognise 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.


LA4022 - COMMERCIAL LAW
ECTS Credits: 6

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


LA4033 - LAW OF THE EUROPEAN UNION 1
ECTS Credits: 6

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 263), 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 on 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.

LA4068 - CRIME AND CRIMINAL JUSTICE
ECTS Credits: 6

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 in 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 policy making, reform and anti-crime initiatives.

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 behaviour orders.

LA4111 - CONTRACT LAW 1
ECTS Credits: 6

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.


LA4205 - NURSING AND MIDWIFERY AND THE LAW
ECTS Credits: 3

Law

Rationale and Purpose of the Module: This module provides an understanding of the role and application of the legal process in the practice of nursing and midwifery.


LA4211 - CRIMINAL LAW 1
ECTS Credits: 6

Law

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


LA4310 - LAW OF TORTS 1
ECTS Credits: 6

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 defences thereto.


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

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 defences thereto.


LA4430 - CONSTITUTIONAL LAW 1
ECTS Credits: 6

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 number of 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

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 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, and 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.

LA4901 - PRINCIPLES OF LAW
ECTS Credits: 6

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.

LA4810 - EQUITY AND TRUSTS 1
ECTS Credits: 6

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.

LS4003 - INTRODUCTORY ANATOMY AND PHYSIOLOGY
ECTS Credits: 6

Life Sciences
Rationale and Purpose of the Module: To provide the foundation for understanding the anatomy and physiological functioning of the human system so as to assist in the study of the effects of illness and disease on the individual. To acquit students without a biological background with the basic concepts of general Anatomy.


LA4610 - LAND LAW 1
ECTS Credits: 6

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 modern Court.
and Physiology while providing a detailed introduction into cellular and tissue biology.

**Syllabus**: Introduction to the body as a whole, tissues, organs, systems, and cavities of the body, filtration, and simple diffusion. Cells: Cellular structure, the cell surface, cytoplasm, Eukaryotic cell structure and function; Principal components, organelle structure and function, genome organization, cytoskeleton and membrane systems. Cellular differentiation and development:
- Cell cycle & cell division, specialised cell types, stem cells, morphogenesis and multicellularity.
- Muscles: Structure and function. The Central Nervous System: Meninges, ventricles and cerebrospinal fluid, blood supply and the brain barrier system, structure and function of the spinal cord, the midbrain, the pons varolii and cerebellum, the cerebrum, medulla oblongata, the limbic system. The Peripheral Nervous System and Reflexes: Classification and anatomy of nerves and nerve fibres, the cranial nerves, the spinal nerves, nerve plexuses, the nature of reflexes, components of a reflex arc. The Autonomic Nervous System: Anatomy of the sympathetic and parasympathetic division, functions of the autonomic nervous system, the adrenal glands, neurotransmitters and receptors.

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**MA2121 - FOUNDATION MATHEMATICS 1**
ECTS Credits: 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module**: To provide students with an appropriate and sufficient mathematical foundation for further study of mathematics at higher education.

**Syllabus**: Modelling using mathematics: simple models; the modelling process; solving simple mathematical models.
- Numbers and number sense 1: common number systems in use; basic arithmetic facts and operations; using a calculator.
- Numbers and number sense 2: fractions; percentages; ratio and proportion; more on calculators; approximation and estimation.
- Algebra 1: algebra as generalized arithmetic; terms and expressions; simplifying algebraic expressions; simple equations and their solution; using formulae. Measurement: standard units; unit conversions; accuracy and precision; everyday use.
- Geometry: basic properties of angles, triangles, circle, polygons, 3-D figures; right angle triangles; symmetry.
- Functions and graphs 1: concept of function; tables and ordered pairs; coordinated plane and graphs; the straight line; gradient, chord, average rate of change.

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**MA2131 - FOUNDATION ENGINEERING MATHEMATICS 1**
ECTS Credits: 6

**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.


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**MA4003 - ENGINEERING MATHEMATICS 3**
ECTS Credits: 6

**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.

**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

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**MA4005 - ENGINEERING MATHEMATICS T1**
ECTS Credits: 6

**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.

**MA4007 - EXPERIMENTAL DESIGN**
**ECTS Credits:** 6

**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

**MA4103 - BUSINESS MATHEMATICS 2**
**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To provide students with the analytical skills required for mathematical analysis in economics, finance and related study areas. To provide students with the mathematical skills required for their final year projects. To introduce mathematical/statistical concepts and techniques which are needed in subsequent mathematics, statistics and business modules. To develop an appropriate foundation in mathematics for students from diverse mathematics background.


**Prerequisites:** MA4102

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**MA4125 - AN INTRODUCTION TO COMPUTER AIDED DATA ANALYSIS**
**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To introduce the student to elementary statistical analysis of real data using four basic, commonly occurring, statistical models (the Bernoulli, Binomial, Poisson and Normal) using the Statistical Package, SPSS (Statistical Package for the Social Sciences).

**Syllabus:** The course introduces the mathematical statistical details of the models considered and presents methods of estimation and inference for these at a level appropriate for numerate business students. Contemporaneously, details of the Statistical Package SPSS are presented and developed in the lab until the students are confident enough to run the package independently. The methods of statistical analyses for the four models are then worked up systematically with different data sets until the students can integrate the process of problem recognition, model identification, statistical analysis (using SPSS) and interpretation.

**Prerequisites:** MA4104, MA4103, MA4102

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**MA4402 - COMPUTER MATHS 2**
**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To develop some of the foundations of mathematics. To introduce the students to mathematical ideas of crucial importance in computer science. Symbolic mathematics packages will be used to demonstrate many of these ideas.
**Syllabus:** Real-valued functions: a geometrical approach to calculus through the graphs of functions of one or two variables (use will be made of symbolic maths packages).

Convergence of sequences.

Simple numerical methods. Iteration of functions.

Matrices: addition, multiplication and scalar multiplication. Matrices as linear transformations in computer graphics.

Graph theory: basic concepts of vertices, edges, paths, circuits, connectedness and trees. Computer representation of graphs. Graph algorithms.

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**MA4413 - STATISTICS FOR COMPUTING**

ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the student to probabilistic ideas through the medium of information theory.


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**MA4603 - SCIENCE MATHEMATICS 3**

ECTS Credits: 6

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 methods in their work.

To develop skills in the use of these techniques through actual case studies using statistical software packages.


Prerequisites: MA4603
MA4617 - INTRODUCTION TO FLUID MECHANICS
ECTS Credits: 6

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

MA4701 - TECHNOLOGICAL MATHEMATICS 1
ECTS Credits: 6

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.

MA5001 - ADVANCED ENGINEERING MATHS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To develop, through an advanced mathematics module, a high level of numerate skills in chemical engineering problem solving.


Indefinite and Definite Integrals. Numerical integration techniques.

Ordinary Differential Equations. Solution of linear, first, and higher order ODEs. Applications of first order ODEs in mass and energy balance calculations.


Applications of ODEs and PDEs in chemical engineering.

MA5211 - RESEARCH METHODS 1
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To provide students with the skills necessary: to formulate research goals; to design a study to achieve these goals; to collect the necessary data; to analyse these data; and to prepare a research report.

Syllabus: Formulation of a research question; the development of data collection mechanisms; the design of a questionnaire; validity and reliability; the uses of a pilot study; the difference between a sample and a census; the principles of sampling; random sampling; convenience sampling; the problem of non-response; the preparation of data for computer analysis using statistical packages; descriptive statistics including tables, plots and summary statistics; the elements of estimation, hypothesis testing, confidence intervals and regression; the preparation of a research report.

MA6001 - DATA ANALYSIS FOR BUSINESS DECISIONS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To give students a conceptual introduction to the field of statistics and its applications. To enable students to apply statistical methodologies in their own organisations. To provide students with a full understanding of how statistical inference provides sound evidence for business decisions.

Syllabus: Data and Statistics - various types of data, qualitative and quantitative data, sources of data. Graphical presentation of data - bar charts, pie charts, histograms, ogive curves, box plots. Measures of location and spread - mean, median, mode, range, standard deviation and variance. Introduction to probability - discrete and continuous distributions e.g. Binomial, Poisson and Normal. Sampling and Sampling Distributions - populations and samples, various sampling methods. Point and Interval estimation for means, variances and proportions in one and two sample applications. Hypothesis testing - One and two tailed tests, type I and type II errors, p - values. Analysis of qualitative data - contingency tables, goodness of fit tests. Correlation and Linear Regression - scatter plots, method of least squares, use of residuals to validate model. Analysis of Variance. Multiple Regression - multicollinearity, dummy variables, model assumptions, variable selection procedures. Applications of statistics - forecasting, quality control, index numbers, decision analysis. Non parametric Statistics - sign test Wilcoxon signed - rank, Mann - Whitney and Krusaal - Wallis tests. Spearman's test for linear correlation. The course will be underpinned by extensive use of Case studies Statistical software packages Student organisation based assignments.
MA6011 - CRYPTOGRAPHIC MATHEMATICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the concepts of Number Theory that underpin cryptographic algorithm techniques and cryptanalysis and to develop skill in deductive reasoning. At the conclusion of the module a student should have the knowledge to handle the mathematics involved in public key cryptography and in the analysis of conventional key ciphers.


MB4001 - ALGEBRA 1
ECTS Credits: 6

Mathematics & Statistics

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.

MB4005 - ANALYSIS
ECTS Credits: 6

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: &bull; Set theory: equivalence classes of sets, cardinal numbers, countability and uncountability, including the uncountability of R. &bull; Functions of a real variable: limits, continuity and differentiability from first principles. &bull; Multivariate functions: inverse function theorem, implicit function theorem. &bull; Complex functions: differentiability and Cauchy-Riemann equations. &bull; The completeness property: Bolzano-Weierstrass theorem, Cauchy sequences and completeness. &bull; Sequences and series of functions: pointwise and uniform convergence, term-by-term differentiation and integration. &bull; General topology: Euclidean n-space, metric spaces, connectedness, compactness, fixed point theorem, Hilbert spaces.

Prerequisites: MS4021, MS4022

MD4005 - ANALYSIS
ECTS Credits: 6

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: &bull; Set theory: equivalence classes of sets, cardinal numbers, countability and uncountability, including the uncountability of R. &bull; Functions of a real variable: limits, continuity and differentiability from first principles. &bull; Multivariate functions: inverse function theorem, implicit function theorem. &bull; Complex functions: differentiability and Cauchy-Riemann equations. &bull; The completeness property: Bolzano-Weierstrass theorem, Cauchy sequences and completeness. &bull; Sequences and series of functions: pointwise and uniform convergence, term-by-term differentiation and integration. &bull; General topology: Euclidean n-space, metric spaces, connectedness, compactness, fixed point theorem, Hilbert spaces.

Prerequisites: MS4021, MS4022

MD2001 - REFLECTIVE PRACTICE PORTFOLIO
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide a deeper understanding of the historical development of these Irish traditions.

Syllabus: In this module, as in Traditional Music and Dance Studies 2 and 3, students will follow three streams of study concerning instrumental music, song and dance. This module will deal with music, song and dance up to 1900, approaching the historical development of the tradition in pre-twentieth century Ireland and its various roots and equivalent developments abroad. The areas covered will be Song in Ireland û Texts and Manuscripts; Harp Music û Rise and Fall of an Irish Art Music Tradition; The History of Irish Traditional Dance.

MD4023 - IRISH TRADITIONAL MUSIC AND DANCE STUDIES 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide a deeper understanding of the historical development of these Irish traditions.

Syllabus: In this module, as in Traditional Music and Dance Studies 2 and 3, students will follow three streams of study concerning instrumental music, song and dance. This module will deal with music, song and dance up to 1900, approaching the historical development of the tradition in pre-twentieth century Ireland and its various roots and equivalent developments abroad. The areas covered will be Song in Ireland û Texts and Manuscripts; Harp Music û Rise and Fall of an Irish Art Music Tradition; The History of Irish Traditional Dance.

MD4021 - INTRO TO IRISH TRAD MUSIC AND DANCE STUDIES 1
ECTS Credits: 6

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: In this module students will engage in a
self-directed research project concerning an aspect of the music or dance tradition under the supervision of course directors. This will be assessed through two seminar presentations and an extensive written submission. This research project could have a performance orientation.

MD4031 - CONTEXTUALISING AND VOCATIONAL STUDIES 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module:
Contextualising and Vocational Studies 1
Popular Music and Dance Studies / Audio/Visual Technology.

This module has two strands with particular purposes - to contextualise interdisciplinary academic fields of popular music and dance studies and to introduce students to audio/visual technology theory and practice in order to begin to build upon such technical skills

Syllabus: In this module students will be introduced to the academic field of popular music and dance studies, examining popular music and dance movements, particularly those relevant to Irish traditions. They will also begin to consider the role of traditional artists as business people, competing in an international market.

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MD4037 - CONTEXTUALISING AND VOCATIONAL STUDIES 6 - WORLD MUSIC AND DANCE SURVEY / VOCATIONAL PROJECT
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To expose students to a broader world of traditional music and dance under the rubric of world music, and to develop a vocational project relevant to the potential future professional experience of the student.

Syllabus: In the first part of this module students will study the music and dance in the context of 'world music' with a specific focus on England, Scandinavia, Scotland, Brittany, Galicia, North America, North Indian Classical traditions, and Indonesia. This part of the module will be assessed through course-work and exam.

In the second part of the module students will engage in a self-directed project relating to the application of vocational aspects of performance that have been addressed through the course (education, community music / dance, technology, business). The assessment of this will be decided by the course director or relevant members of staff and be appropriate and individual to the project chosen, subject to approval by the student.

MD4041 - PERFORMANCE STUDIES 1: AN INTRODUCTION
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To introduce students to the academic discipline of performance studies and its underlying principles, as an scholarly approach to research in the performing arts; to provide students with the theoretical tools to engage in discourse around the performing arts of dance, movement, vocal performance and the exploration of creativity through these media.

Syllabus: This module provides an introduction to the principles, practices and discourses of performance studies including its interdisciplinary origins, ethical questions and theoretical paradigms of performance, performativity, ritual, social drama, play, performatives, speech acts, trance, masking, gender, global and intercultural performance.

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MD4043 - PERFORMANCE STUDIES 3: INTRODUCTION TO RITUAL STUDIES
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To introduce students to the academic discipline of ritual studies and its impact on performance and performance studies: to explore research methods developed in ritual studies which are relevant to the study of performance; to engage with the paradigm of ritual towards a creative and reflexive understanding of performance.

Syllabus: An introduction to ritual studies and its relevance to performance studies including ritual paradigms of theatre, musical performance, dance performance, social drama, play, sport, games, trance, shamanism, puppetry, masking, liturgy and rites of passage; the exploration of creative research methods generated from the use of symbolism in ritual and the development of nascent rituals.

MD4047 - PERFORMANCE STUDIES 5: INTERCULTURALISM AND PERFORMANCE / FYP
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To introduce students to the discourse of global and intercultural performance including current research perspectives, ethical issues and performance practice as political engagement.


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MD4053 - SOMATICS AND RITUAL PERFORMANCE 3
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: This module will provide each student with the opportunity to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance. It will also provide the opportunity to develop skills to create innovative new models for ritualising performance and increase their options for professional practice.

Syllabus: This module will provide each student with the opportunity through the study and practice of Authentic Movement, Feldenkrais and Alexander techniques to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity for students to develop skills necessary to explore and develop innovative models for ritualising...
Humanities

Rationale and Purpose of the Module: This module will provide each student with the opportunity to continue to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance; it will also provide the opportunity to develop skills and confidence to create innovative new models for ritualising performance; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice.

Syllabus: This module will provide each student with the opportunity to continue the study and practice of Authentic Movement, Feldenkrais and Alexander techniques to develop skills to research and develop an informed and intelligent approach to own specific technical needs and also so they can develop healthy and sustainable practices in preparation for professional practice; students will specialise in creating a project within a specific context and begin to focus on their preferred options for professional practice.

Humanities

Rationale and Purpose of the Module: This is an elective module for second, third or fourth year BA Irish Music and Dance Students interested in issues of ethnicity and identity as imagined, expressed, and performed through the genre of Country music in Ireland and in the US. Understanding this genre as a vernacular tradition in its particular regional/national contexts will shed light on what is at stake for those who perform and consume country music.

Syllabus: Students will look at the phenomenon of country music, placing particular emphasis on connections between Ireland and America as manifest in the sounds and narratives of this genre. The course will involve gaining a greater understanding of the vernacular tradition(s) of country music (i.e. country music in Ireland), as well as more generally concerned with definitions of the genre and how and where these definitions hold up or break down under scrutiny. Focusing on narratives of country music will involve looking at song themes and topics (such as loss and desire, myth of the West, the open road, etc), as well as inviting a greater understanding of the genre itself and the kinds of musical/historical/political/cultural pathways it has and continues to follows (spiritual dimension, ethnic profile, national characteristics, gender roles, song construction). Ultimately, students will concern themselves with the questions of how identity is imagined, constructed, maintained, and negotiated through sound, sentiment, and narrative song performance and its subsequent reception in historical and current contexts.

Humanities

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Humanities

Rationale and Purpose of the Module: To provide an introduction into current media technologies as they are used in the fields of performing arts, creative arts therapies, and arts research; to develop essential skills and fluency in these technologies in order to use them competently, creatively, and effectively in one's own specific discipline.

Syllabus: Students will be introduced to the current media technologies in audio, video and stagecraft/soundcraft/lightcraft as pertinent to the programmes offering the course. Students will study and practise essential skills required to employ technology to create an audio/video project related to their field of study, using stagecraft/soundcraft/lightcraft where applicable.

Humanities

Rationale and Purpose of the Module: The purpose of this module is to equip students with a knowledge of the emergence and development of ritual studies as an
interdisciplinary discourse drawing on anthropology, sociology, religious studies, ethnomusicology, and ethnochoreology and performance studies. It also familiarises students with a variety of theoretical approaches to ritual including evolutionary, structural-functionalist, cultural-symbolist and performative understandings. This is grounded with reference to several case studies of ritual practice drawn from historical and cross-cultural practices.

Syllabus: This module provides an introduction to the emergence and development of ritual studies as an interdisciplinary discourse drawing on anthropology, sociology, religious studies, ethnomusicology, and ethnochoreology and performance studies. It introduces studies to evolutionary, structural-functionalist, cultural-symbolist and performative theories of ritual. It also discusses a number of ritual case studies including historical and cross-cultural examples of ritual practice. The documentation of live rituals through ethnographic approaches including participant-observation will also be introduced.

MD6051 - INDEPENDENT STUDY 1
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: - To initiate self-directed study as a means of (1) deepening knowledge / expertise within a primary specialisation (2) developing skills and knowledge in a secondary area of specialisation (3) engaging in creative, cross-platform study / performance through a combination of a variety of areas. - To allow a variety of project presentation and negotiable assessment weighting, encouraging the student to propose a form of presentation most suitable to the project and the educational journey, as well as a form of assessment capable of accurately evaluating the outcomes.

Syllabus: This module offers students the opportunity to pursue self-directed learning of an academic or performance-based project, under the guidance of the course director and supervisor. The student may wish to use the module to pursue more specialised study in his / her area of study, or to access the other areas of expertise available at the centre. These currently include Ethnomusicology, Ethnochoreology, Music Education, Community Music, Music Therapy, Irish Traditional Music and Dance Performance, Classical String Performance, Contemporary Dance Performance, Ritual Chant and Song, Festive Arts, and other specialist research interests of faculty and doctoral researchers at the Irish World Academy.

MD6061 - INTRODUCTION TO SOMATICS
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: This module will ensure that students are educated in somatics practices that promote a healthy and mindful approach to movement. The continued development of an integrated mind/body approach will enable students to perform with greater efficiency and will minimize their risk of injury.

Syllabus: Students will attend workshops during which they will study how somatic practices can support them in developing an enhanced awareness of embodied movement. These workshops will be based on principles drawn from: Pilates, Yoga, Feldenkrais, Body-Mind Centering and T’ai Chi

MD6071 - WRITING AND THE DOCUMENTATION OF ARTS PRACTICE 1
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: The purpose of this module is to explore a variety of approaches to the documentation of artistic practices, with a focus on documentation through writing.

Syllabus: Students will explore a variety of approaches to the documentation of artistic practices, with a focus on documentation through writing. These include forms of documentation emerging from personal memory data, self observation and reflection, as well as the collection of data from external sources including mentors and artistic colleagues. Registers of writing including the poetic, narrative, chronological and critical will be investigated. The role and function of writing in the creative process will be interrogated through creative and critical engagement. Methodological frameworks for the documentation of practice including autoethnography and narrative inquiry will be introduced.

MD6081 - CRITICAL ENGAGEMENTS WITH IRISH TRADITIONAL MUSIC
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: To examine manuscript, printed, audio and visual sources of Irish traditional music. Students will engage trends in current research in the field of traditional music studies.

Syllabus: In this module students will examine writings on and sources of Irish traditional music to enhance their understanding of this tradition. They will critically engage with texts relevant to Irish traditional music studies and related fields.

MD6091 - PROFESSIONAL DEVELOPMENT FOR THE PERFORMING ARTS
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: This module is designed to provide an awareness of professional development skills and contexts central to developing a career in the arts. It introduces students to several key facets of planning, arts project management, and career development as part of their professional development.

Syllabus: This module provides students with an introduction to key skills and concepts relevant to the development of performing arts careers in the contemporary world. Key issues covered include project development, planning, communications and pitching, as well as collaborative work, legal structures for working individually or in groups, and fundraising.

MD6101 - INTERDISCIPLINARY IMPROVISATION
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: To provide an overview of improvisational processes within the context of current dance and music practices. To introduce the students to a range of aesthetic and technical
approaches to improvisation. To provide for students to research improvisational processes and to integrate and apply this knowledge in their own practice.

**Syllabus:** Students will attend a number of workshops in which music and dance faculty will demonstrate and explore improvisational processes and practices. Students will develop improvisational scores based on the materials presented.

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**MD6111 - COLLOQUIUM 1**

**ECTS Credits:** 3

**Humanities**

**Rationale and Purpose of the Module:** The purpose of this module is to encourage and facilitate postgraduate students to engage with a community of scholars and practitioners presenting their respective work, from a variety of disciplinary and performance practice perspectives, in a formal, large-scale and medium-scale colloquium/seminar context, drawing from in-house seminars including the Tower Seminar Series, Logos, and other seminars. Students will expand their knowledge from within and outside of their own specialisations, and will tacitly learn about presenting their own work in such a format.

**Syllabus:** This module will expose students to scholarship and performance practices from a wide variety of music and dance faculty, enabling students to broaden their perspectives on their own specialisation as well as experience presentations from scholars and performers in cognate disciplines. Students will be expected to attend five seminars from the various series offered in the Academy (Tower Seminar series and/or comparable events, as approved by participating programme coordinators). As a consequence, engage in self directed inquiry and independent study where they have come across a topic or research/performance approach that stimulates their own research practice.

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**MD6112 - FESTIVAL DEVELOPMENT AND PRODUCTION**

**ECTS Credits:** 3

**Humanities**

**Rationale and Purpose of the Module:** To provide students with a foundation in the issues surrounding festival production and sustainable development.

**Syllabus:** This module provides students with a foundation in the issues surrounding festival development and sustainability, covering a range of topics including events production, audience development, feasibility, public relations, media relations, fundraising, stakeholder and partnership development, security, local authorities, and health and safety.

**Prerequisites:** MUs081

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**MD6131 - INTRODUCTION TO LOCAL AND GLOBAL FESTIVITY**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** To provide students with a contextual, cross-cultural understanding of festival, based on case studies of specific local, national and international festivals.

**Syllabus:** The aim of this module is to introduce students to key perspectives in the study of festivity and its dynamics in society, through an exploration of festival and festivity in different historical and geographical contexts. Through the exploration of case studies and key contextual readings, students develop conceptual, theoretical and methodological frameworks for the study and understanding of festivity in society.

**Prerequisites:** MUs091

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**MD6141 - RESEARCH AND DISCOVERY FOR FESTIVAL STUDIES**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** To introduce students to methods for studying public, religious, domestic and civic festivity with a particular emphasis on the social role of festival and on performative aspects of festive activities. It critically engages with different methods of gathering data and narratives on festival, as well as with core ideas such as the definition of value, of identity and of public space.

**Prerequisites:** MUs081

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**MD6151 - MATERIALS, METHODS & CONTEXT FOR WESTERN CHANT 1**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** To facilitate an understanding of methodologies and theoretical paradigms relevant to the study and performance of Western plainchant, drawing on both historical musicological and ethnomusicological approaches. To introduce Western plainchant from its beginnings until the later Middle Ages, exploring it in its historical, social, religious, liturgical, intellectual and aesthetic contexts. This will include an investigation of its origins and evolution; nature, materials, forms and styles in relation to function, date and place; written sources and their palaeography; notation (general concepts and features; notations of particular regions and periods; principles and techniques of transcription and editing).

**Syllabus:** This module lays the basis for important research and methodologies that relate to the performance practice of Western plainchant. It will introduce students to fundamental research tools in primary and secondary sources, bibliographic and referencing techniques, historical contextual knowledge, musical palaeography and semiotics. The methodological approach is presented as an interdisciplinary pursuit combining historical musicology, ethnomusicology, semiotics and relevant critical theory.

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**MD6161 - IRISH TRADITIONAL MUSIC PERFORMANCE RESEARCH SEMINAR**

**ECTS Credits:** 3

**Humanities**

**Rationale and Purpose of the Module:** This module will introduce students to current research in the area of traditional music studies. This research will be engaged
through the critical assessment of current publications in the field, examining developments in the epistemology and phenomenology of current critical academic engagement with this historical artistic practice. The module will particularly examine the impact, real and potential, of these developments on the performance practice.

**Syllabus:** In this module students will study the history, theory and practice of Irish traditional music. They will be encouraged to use theoretical tools from a number of disciplines to enhance their understanding of this practice. They will examine publications and resources that examine Irish traditional music in an exemplary and innovative fashion.

**MD6171 - FRAMING IRISH MUSIC: SOURCES AND DISCOURSES 1**  
ECTS Credits: 9

**Humanities**

**Rationale and Purpose of the Module:** The purpose of this module is to explore the printed, manuscript, and audio-visual sources of Irish Music, and to examine the main discourses around this music over the past three centuries. This module is one of six offered by the Irish World Academy as part of a joint PhD in The Anthropology of Irish Music coordinated with the Keough Naughton Institute of Irish Studies, University of Notre Dame.

**Syllabus:** By means of a systematic examination and analysis of printed, manuscript, and audio-visual sources of Irish Music (including Dance), as well as an investigation of the central discourses surrounding the music, this module opens up the origins of the music alongside its conceptual articulation both by the music performers themselves as well as by the rapidly increasing integration of this music within an academic context.

**MD8001 - ARTS PRACTICE RESEARCH 1**  
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** The aim of this module is to introduce students to a variety of theoretical perspectives on arts practice research, towards the development of a framework suited to the specialist needs of individual research questions.

**Syllabus:** This module addresses basic questions concerning the design and framing of a research project, including ways of framing research questions, the relationships among theory and practice in research, research ethics and issues of representation in ethnographic writing. It also addresses hands on questions concerning the practice of qualitative research, ethnographic fieldwork and field based research methods, the interview process, bibliographical and other resources, documentation and writing strategies. It purposely crosses boundaries between creative process in the arts and sciences in ways appropriate to our population of scholar/artists and research/practitioners. Its subject, then, is research methodology as reconceived for this practice-research programme. Work in this module is explicitly multi-modal in character, Teaching faculty will address, among other topics, challenges facing students doing arts practice research, ethnographic methods in dance, music and performance research, analytical tools for dance, music and performance artists; examination of the role and function of writing and its further integration as a generative strand of the process of invention; what research structure (apparatus) can provide for the crossing of thresholds between the studio-based and text-based strands of arts-practice research.

**MD8013 - IWA SPECIALIST ELECTIVE 3**  
ECTS Credits: 12

**Humanities**

**Rationale and Purpose of the Module:** The aim of this module is to facilitate the development of specialist skills, relevant to the research project, through the design of a self-direction programme of study which may integrate performance, composition, choreography, academic writing and collaborative work.

**Syllabus:** This module comprises a programme of self-directed learning which is created to facilitate the development of the research programme. It is design by the student in consultation with his/her supervisor and supervisory panel and may include performance, composition, choreography, academic writing and collaborative work.

**MD8021 - IWA SPECIALIST ELECTIVE 1**  
ECTS Credits: 12

**Humanities**

**Rationale and Purpose of the Module:** The aim of this module is to facilitate the development of specialist skills, relevant to the research project, through the design of a self-direction programme of study which may integrate performance, composition, choreography, academic writing and collaborative work.

**Syllabus:** This module comprises a programme of
self-directed learning which is created to facilitate the development of the research programme. It is design by the student in consultation with his/her supervisor and supervisory panel and may include performance, composition, choreography, academic writing and collaborative work.

MD8041 - CREATIVE PROCESS AND IMMERSIVE PRACTICE 1
ECTS Credits: 9

 Humanities

Rationale and Purpose of the Module: The purpose of this module is to support students to explore their creative process in an artistic practice as a means of enhancing their creative experience, practice and research through interaction with artists, mentors and creative practitioners; participation in key artistic events and visits to relevant organisations / institutions including international arts festivals; opportunities to share work in the students’ own creative media; scholarly engagement with theories of creativity; critical reflexive writing and documentation of one's own artistic practice and experiences on the module.

Syllabus: This module is constructed, delivered and assessed to encourage students to explore their creative process in artistic practice. Through a combination of artistic and scholarly activities, it aims to provide multiple opportunities and approaches towards a reflexive engagement with the students’ own creative practice. The work of the module is multi-modal in character and includes postgraduate seminars on creativity and creative process methodologies including arts practice research, ethnography, autoethnography and narrative inquiry; personal reflections on creative process from internationally recognized artists and creative practitioners and artistic immersions in a number of identified arts events / venues including international arts festivals and performances. The module will combine discussion-based seminars, site specific artistic experiences / venue visits / conversations / participation, peer learning and mentoring. The module intends to support students in the development and realization of a portfolio of reflexive work documenting their creative process and reflections on their artistic practice.

ME4001 - INTRODUCTION TO ENGINEERING 1
ECTS Credits: 3

 Mechanical, Aeronautical and Biomedical 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.

ME4011 - CONTROL ENGINEERING
ECTS Credits: 6

 Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To provide a fundamental understanding of:
- Principles and techniques of measurement
- Characteristics of instruments and instrumentation systems
- Principles and elements of feedback control systems.
- Block diagram analysis and dynamic behaviour of 1st order systems
- Automatic control engineering

Syllabus: 1. Sensors, transducers and transmitters
2. Instrument specification
3. Standard instrumentation signal levels
4. Signal transmission
5. Dynamic errors
6. Open and closed loop control systems
7. Control systems components - error detectors, controllers, final control elements
8. Block diagrams and transfer functions
9. Standard process inputs
10. Dynamic response of first order systems.
11. Laplace Transforms
12. Dynamic behaviour closed loop control systems
13. Controller design using frequency response criteria
14. Stability of closed loop control systems

Prerequisites: ME4714

ME4037 - ADVANCED MECHANICS OF SOLIDS
ECTS Credits: 6

 Mechanical, Aeronautical and Biomedical 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.


ME4047 - FUELS AND ENERGY CONVERSION
ECTS Credits: 6

 Mechanical, Aeronautical and Biomedical Engineering


ME4057 - AEROSPACE METALLIC MATERIALS
ECTS Credits: 6
ME4111 - ENGINEERING MECHANICS 1
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To enable students to achieve fluency and confidence in the application of Newton's Laws of Motion to particle and rigid body mechanics problems in which the bodies are in static equilibrium. In particular to become proficient in the use of Free Body Diagrams.

Syllabus: Application of Newton's Laws to particles and rigid bodies in equilibrium (Statics); equivalent force systems; two-and-three-dimensional force systems in equilibrium; analysis of rigid trusses and frames; centroids, centres of gravity, distributed forces, area and mass moments of inertia; friction.

Prerequisites: ME4112, ME4111

ME4117 - VIBRATION ANALYSIS
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To develop an understanding of the role of vibration analysis in structural design. To apply the techniques of modal analysis and the finite element method to solve structural vibration problems.


Prerequisites: ME4112

ME4121 - ENGINEERING SCIENCE 1
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To provide students with a basic knowledge of the fundamental principles underlying engineering mechanics.


ME4213 - MECHANICS OF SOLID 1
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical 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.


ME4227 - AIRCRAFT STRUCTURES
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: The objective of this module is to develop an ability to apply the principles of engineering mechanics in solving common problem involving mechanisms such as linkages, cam/followers and gear trains.

Syllabus: 1. Kinematics of Simple Mechanisms and Linkages:
   * Four-bar linkages and straight line mechanisms.
   * Position, velocity and acceleration analysis of linkages.
   * Problem solving using velocity and acceleration vector diagrams.
   * Analysis of linkages influenced by Coriolis effects.

2. Cam/Follower Systems:
   * Kinematic analysis of follower motion; velocity and acceleration.
   * Graphical cam design.

3. Gear Trains:
   * Gear kinematics and dynamics
   * Simple and compound trains.
   * Epicyclic gear trains
   * Torque and power transmission.

4. Balancing:
   * Balancing of rotors; static and dynamic balancing.
   * Balancing of reciprocating masses.

5. Oscillatory Motion:
   * Free and forced vibration of particles.
   * Rigid body vibration.
   * Vibration analysis of mechanisms.

6. Gyroscopic Motion:
   * Steady-state gyroscopic precession.
   * Applications of the gyroscopic principle.

Prerequisites: ME4112, ME4111
Rationale and Purpose of the Module: Module builds on the Mechanics of Solids 2 module by providing further skills in the analysis of stress, strain and deformation of aircraft structures.


Prerequisites: ME4616, ME4426

ME4307 - BIOMATERIALS 1
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical 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.


ME4424 - AERODYNAMICS 1
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical 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
Thick boundary layer, 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

ME4438 - COMPUTATIONAL FLUID DYNAMICS
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering

Syllabus: The philosophy of CFD; fundamentals of vector fluid dynamics; fundamentals of viscous fluid deformations; the governing equations of fluid dynamics; basic discretisation and grid generation techniques; the finite volume method; application to convection-diffusion problems; pressure-velocity coupling; implementation of boundary conditions; fundamentals of turbulence modelling.

Prerequisites: ME4523, ME4516

ME4523 - THERMODYNAMICS 1
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical 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


ME4611 - COMPUTING
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To provide the student with a good knowledge of structured program design for engineering applications

Syllabus: Introduction to computer organisation, programming languages, top-down design techniques; arithmetic operations including intrinsic functions; control structures; data files and input/output system; single
and multidimensional array processing; implementing top-down design with functions and; character, and complex data; data files; numerical applications; and engineering applications. Plotting functions. Use of Microsoft Outlook.

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**ME4727 - STABILITY AND CONTROL OF AIRCRAFT**  
ECTS Credits: 6

**Mechanical, Aeronautical and Biomedical Engineering**

**Rationale and Purpose of the Module:** To provide an appreciation of the critical design issues associated with stability and control of aircraft. To enable students to analyse stability and control or aircraft problems with standard mathematical tools for linear systems, and design simple autopilot and stability augmentation systems.

**Syllabus:** Equations of motion for a rigid body aircraft; physical basis for longitudinal and lateral stability derivatives; solution of the equations for free longitudinal motions, phugoid and short period modes, flight paths, variation of roots with C.O.G. position, flying qualities; free lateral motion; basic control theory, transfer functions, block diagrams, state space to transfer function representations for MIMO systems, the root locus technique; open loop control - response to controls; closed loop control, autopilots with displacement and velocity feedback, stability augmentation systems with velocity feedback and full state feedback.

**Prerequisites:** ME4611, PE4112

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**ME6001 - FUNDAMENTALS OF CONTINUUM MECHANICS**  
ECTS Credits: 6

**Mechanical, Aeronautical and Biomedical Engineering**

Basic concepts and definitions: Concept of a continuum, continuity, homogeneity and isotropy; Elements of vector and tensor algebra. Deformation and flow: Length and angle changes: Strain tensor; Material and Eulerian description; Deformation rate tensor. Stresses: Body and surface forces; Stress tensor; Principal stresses, Stress invariants, Hydrostatic and deviatoric stresses. Fundamental laws of continuum mechanics: Mass conservation, Newtons laws, Conservation of energy. Constitutive relations: Ideal materials; Constitutive relations and equations of state; Elastic solids; Newtonian fluids. Mathematical models: Linear elastic solids; Newtonian fluids; Initial and boundary conditions. Introduction to the Finite Element method: Principle of virtual work; Finite element discretisation; Linear elastic finite-element model; Shape functions; Numerical quadrature; Mapping of elements; Solution of the finite-element equations.

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**ME6031 - ADVANCED STABILITY AND CONTROL OF AIRCRAFT**  
ECTS Credits: 6

**Mechanical, Aeronautical and Biomedical Engineering**


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**ME6051 - ADVANCED TECHNICAL COMMUNICATION FOR ENGINEERS**  
ECTS Credits: 3

**Mechanical, Aeronautical and Biomedical Engineering**

This module builds a foundation for the dissemination of research results by preparing engineering students for publishing/writing as a part of their professional careers and/or further postgraduate studies. Students in this module examine the communicative, metacognitive, affective and social strategies that they employ as they negotiate their way through their writing, research and publishing processes. Students develop criteria for measuring the effectiveness of the strategies they employ as they go through these three processes and develop strategies for developing alternatives to ineffective strategies. Students also learn to assess the
MG4035 - INTERNATIONAL MANAGEMENT
ECTS Credits: 6
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 arise when operating at the international level?
2.) How do we understand differences between countries when managing internationally, and what are the implications of these differences for international managers?
3.) What is the most appropriate way for firms to internationalise, and to manage and structure their activities?
4.) 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, convergences and divergences; Firm Internationalisation - 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
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
Management and Marketing

Rationale and Purpose of the Module: It specifically focuses upon the development of research skills which are fundamental to understanding and undertaking marketing activities.

1. To build upon theoretical frameworks introduced in Marketing Intelligence
2. To develop marketing research skills that can be applied to a range of marketing contexts (e.g. sales, advertising, NPD, customer satisfaction)
3. To equip students with the skills necessary to: develop research instruments, conduct fieldwork and data analysis/interpretation and present research findings.
4. To encourage and support effective teamwork and project management.

Syllabus: The marketing research skills will be fostered through a management of an extensive student project: Developing research objectives (e.g. problem definition); Research design and creation of research proposal; Collection, interpretation and analysis of secondary research; Collection, interpretation and analysis of primary research; Research presentation.

Prerequisites: MK4002

MK4017 - MARKETING LEADERSHIP
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This module aims to underline the strategic importance of marketing. To this end, it aims to investigate the relationship between marketing and the other functional areas and to explore the role of marketing planning. Finally, the module attempts to critically evaluate the marketing vision.

Syllabus: The module addresses the marketing vision and suggests how the marketing planning and management process contribute to and deliver upon such a vision. Next the module addresses the relationship between marketing and the other functional areas, and assesses the role of marketing in the boardroom. The module also considers value-based marketing and the application of marketing techniques internally within the organisation's marketing. As such the module will critically consider the potential for organisational renewal through marketing.

MK4005 - MARKETING INTELLIGENCE
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This course is about gathering, analyzing, and interpreting data about markets and customers, in order to make informed marketing decisions. Students will learn how to determine what information is required to make the decision, how to acquire trustworthy and relevant data, how to assess its appropriateness, and how to analyze the data to make key types of marketing decisions. The module is focused on utilizing marketing data and transforming them into actionable marketing insights, that aids in the development of effective strategy.

Syllabus: Sources and Use of Marketing Intelligence, The Role of Research and Intelligence in the Marketing Organisation, Typologies of Marketing Data (Interaction, Attitudinal, Descriptive, Behavioural Data), Research for Marketing Decision Making, Marketing Databases, Marketing Segmentation & Targeting, Loyalty Cards, New Product Development & Test Marketing, International Market Analysis, Advertising Research, Media Research, Sales Forecasting, Salesforce Automation, Marketing Automation, CRM Systems, Category Management, Store Location Techniques, Pricing Research, Customer Feedback, Key Performance Indicators Used in Marketing, Marketing Metrics, Appropriateness of Research Methods - (Survey, Questionnaire, Interviews & Observation), Social Media Intelligence, Social CRM, Data Mining & Big Data, Customer Privacy & Ethics.

MK4007 - APPLIED MARKETING 1
ECTS Credits: 6

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.
Prerequisites: MK4002

MK4025 - MARKETING COMMUNICATIONS
ECTS Credits: 6
Management and Marketing

Rationale and Purpose of the Module: To introduce students to communications theory. To establish the fundamentals of marketing communications. To explore the nature and influence of the institutions of consumer culture. To consider different marketing communications techniques and be cognisant of contemporary trends in the field. To investigate alternative understandings of advertising. To demonstrate how different communications techniques can be combined and interrelated to form the basis of positive international marketing communication strategies. To appreciate the impact which marketing communications have on our lives.

Syllabus: Role of communications, communications theory, audiences, how advertising works, the management of marketing communications, the advertising industry, creative aspects of advertising, media aspects of advertising, ethics and advertising standards, communication vehicles (sponsorship, public relations, direct marketing, consumer sales promotions, trade shows and exhibitions, internet marketing communications tool, internal marketing communications), integrated marketing communications, the planning and management of an integrated marketing communications plan, the effects and effectiveness of marketing communications, future developments in marketing communication.

MK4603 - MARKETING
ECTS Credits: 6
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.

MK4007 - PROJECT MANAGEMENT THEORY AND PRACTICE
ECTS Credits: 6
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 organisational 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 through 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, tops 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.

MS4008 - MATHEMATICAL METHODS 2: Numerical Methods for Partial Differential Equations
ECTS Credits: 6
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.


Prerequisites: MS4404

MS4021 - CALCULUS 1
ECTS Credits: 6
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: &bull; Basic properties of the real numbers: Important subsets (natural, integers, rationals), open and closed intervals, neighbourhoods, supremum, infimum, boundedness, compactness. &bull; Algebra of Complex numbers: modulus, phase, Argand diagrams, de Moivre's theorem and roots of complex numbers. &bull; 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.

MS4027 - FUNDAMENTALS OF FINANCIAL MATHEMATICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To give the student the fundamental theory of stochastic calculus as used to model the evolution of asset prices and as applied to the pricing of derivative securities etc. To give the student the fundamental tools of pricing, such as arbitrage and the use of hedging in the construction of replicating portfolios.

Syllabus:


Prerequisites: MS4217, MS4213

MS4033 - METHODS OF LINEAR ANALYSIS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: This is a new module that replaces Linear Analysis MS4013. It includes the previous material on Fourier Series and Laplace Transforms as well as new material on orthogonal functions and Green's functions for ODEs.

Syllabus:

Orthogonal functions, convergence of a series of orthogonal functions (using trigonometric functions and Legendre polynomials as examples).


Linear transformations: Laplace transform and properties, application to simple ODEs, application to solving Volterra Integral equations; Fourier transform and properties.

Green's functions: definition, application to solving ODEs, inverses of differential operators, physical interpretation, Green's function via eigenfunction expansions.

Prerequisites: MS4022, MS4122

MS4035 - PROBABILITY MODELS
ECTS Credits: 6

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 student in the standard techniques of complex analysis, integral equations and Green's functions - and to demonstrate applications of these techniques.

Syllabus:

Jointly Distributed Random Variables: joint distribution of a function of a random variable.

Weibull, uniform, normal, exponential, gamma, beta, Cauchy, and variance; statistical applications.

Continuous Random Variables: expectation and variance: a 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

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MS4101 - MATHEMATICAL LABORATORY
ECTS Credits: 6

Mathematics & Statistics

Rationale 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.

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MS4105 - LINEAR ALGEBRA 2
ECTS Credits: 6

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


Prerequisites: MS4102

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MS4117 - DISCRETE MATHEMATICS 2
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To give the student an understanding of the mathematics and applications 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 colouring 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

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MS4124 - STATISTICAL INFERENCE
ECTS Credits: 6

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 confidence intervals based on the MLE. Hypothesis testing: test statistic, Type 1 and Type 2 errors, power function, the likelihood ratio test. **Prerequisites:** MS4213

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**MS4215 - ADVANCED DATA ANALYSIS**  
ECTS Credits: 6

**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.

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**MS4217 - STOCHASTIC PROCESSES**  
ECTS Credits: 6

**Mathematics & Statistics**

Rationale and Purpose of the Module: The purpose of this module is to 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-server queues, steady state solutions) 6. Survival Analysis (basic objects, covariates, MLE)

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**MS4315 - OPERATIONS RESEARCH 2**  
ECTS Credits: 6

**Mathematics & Statistics**

Rationale and Purpose of the Module: This module introduces further OR techniques for decision-making. The student will be able to apply these techniques to real life problems. Syllabus: Integer programming - pure integer programming algorithms, branch & bound solutions to mixed integer programming. Deterministic dynamic programming - forward and backward recurrence formulations. Probabilistic dynamic programming - finite and infinite stage problems. Game Theory - Concepts of equilibrium, matrix games, extensive form games and repeated games. Applications of game theory - models of economic competition (Cournot, Bertrand), evolutionary game theory. **Prerequisites:** MS4213

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**MS4403 - ORDINARY DIFFERENTIAL EQUATIONS**  
ECTS Credits: 6

**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, Bessel’s equation. Sturm-Liouville theory. Nonlinear ODEs: ad-hoc solution techniques, introduction to the concepts of stability and phase plane techniques. **Prerequisites:** MS4022

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**MS4407 - PERTURBATION TECHNIQUES AND ASYMPTOTICS**  
ECTS Credits: 6

**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, Laplace/Es method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques.

**Prerequisites:** MS4403, MS4404

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**MS4417 - PROJECT 1**
**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** This is the first semester of the fourth year project. The project should synthesise many of the major concepts and ideas encountered in earlier taught modules. It should also bring the student beyond the experience of learning by course-work to the brink of learning by research. While original work is not a sine qua non, it should be encouraged to every possible extent.

**Syllabus:** The student in the first semester will undertake a programme of reading and research into the project, which will consist of a substantial problem or review in mathematics, computing, statistics, finance or cognate areas. The project will normally commence with a literature review. The main part of the project may require the use of computers or some calculations by hand.

**Prerequisites:** MS4602, MS4002

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**MS4613 - VECTOR ANALYSIS**
**ECTS Credits:** 6

**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 Green/Es and Stokes’s theorems. Multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, Helmholtz/Es 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:** MS4607, MS4404

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**MS6011 - ADVANCED METHODS 1**
**ECTS Credits:** 6

**Mathematics & Statistics**


Review of complex analysis, particularly Taylor/Laurent series, contour integration, branch cuts, the complex Fourier and Laplace transforms and inversion contours.

Applications of complex analysis, including topics from: representation of solutions of Laplace and biharmonic equations via analytic functions Plemelj formulae, Hilbert problem on the real line, Hilbert transform.


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**MS6021 - SCIENTIFIC COMPUTATION**
**ECTS Credits:** 6

**Mathematics & Statistics**

Review of MATLAB, storage allocation, functions and arrays, matrices, operators and flow control, m-files, graphics, input and output. Review of Fortran 90/95, structure, variables, functions, control structures, basic I/O, arrays, procedures.

Linear algebra
Norms and condition numbers, linear equations, over and under-determined systems, inverse and pseudo-inverse, factorisations, singular value decomposition, eigenvalue problems, practical case studies.

Non-linear equations
To acquaint students with the range of materials and their classification
To explain the origins of materials, their processing, properties and applications

**Syllabus:**
[Historical background to development of materials and] of the subject of [Materials Science].
[Classes of modern materials]:
- [metals] and alloys
- [polymers] and rubbers.
- [ceramics and glasses]
- [composites] including concrete, wood, fibre-reinforced plastics and metal matrix composites.
[Origin of these materials]:
- brief outline of extraction of metals from ores and of processing by casting and mechanical treatment.
- introduction to polymerisation reactions and processing techniques of ‘plastics’
- overview of manufacture of ceramics, refractories and glasses.

**Syllabus:**
- [Properties] of the different classes [and standard testing techniques]
- mechanical properties
- physical properties
- chemical properties.

**Syllabus:**
- [Applications] of different materials [related to] their [properties]
Effects of temperature on polymers and metals.
Mechanical and thermal treatments and properties of alloys.

**Syllabus:**
Available and their classification
To explain the origins of materials, their processing, properties and applications

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- mechanical properties
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**Syllabus:**
- [Applications] of different materials [related to] their [properties]
Effects of temperature on polymers and metals.
Mechanical and thermal treatments and properties of alloys.
Civil Engineering and Materials Science

MT4905 - MATERIALS TECHNOLOGY 4
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To describe the roll of polymers as raw materials and show how they are converted into products.

Syllabus: The nature of polymers, main classes of polymeric materials, their response to heat, thermoplastics and thermosets
Melt processing, materials properties affecting melt processing, introduction to rheology and rheometry.
Extrusion of plastics, extrusion techniques, factors affecting extruder output.
Injection moulding, process description and product design for injection moulding.
Blow moulding, rotational moulding, vacuum forming and related processes.
Cellular polymers, properties and processes.

MT4943 - MATERIALS PROCESSING
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To explain how metals and polymers are converted into products and to identify the key features of the processes involved.

Syllabus: The response of polymers to heat, melt processing, material properties affecting melt processing.
Extrusion of plastics, injection moulding and other plastics processing methods. Analysis of process operations.
Metals processing, solidification and nucleation processes. Casting and forging methods, post production treatment, prevention of residual stress, process design and optimisation.

MU4135 - IRISH TRADITIONAL MUSIC 1
ECTS Credits: 6

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.

MU5023 - MUSIC THERAPY FIELDWORK PRACTICE 2
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: To provide students with the opportunity to develop skills in
1. Providing weekly regular clinical work to clients in a health, welfare, community or education setting
2. Learning in context to apply the framework of assessment, programme planning, implementation, evaluation and reporting

Syllabus: Students will continue a fieldwork placement alongside a qualified music therapist in a health, welfare, community or educational setting in Ireland up to two

The module comprises intensive study within the framework of studio teaching and master classes. The module is based on skill and competency of execution. Contact time with individual teachers concentrates on increased repertoire and more advanced skills and technique.
The knowledge is structured within three key areas:
1. Instrumental skills aiming towards technical fluency and mastery
2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The foundations of repertoire and style formed in Technique, Repertoire & Style 1 & 2, as well as development of more advanced skills and technique.
The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teachers interpretation and revision in actual practice.

Syllabus: The module provides progressive tuition, within the framework outlined in Technique, Repertoire & Style 1 and Technique, Repertoire & Style 2.
The ultimate goal of the module is to improve the quality of the music making and artistry demonstrated by the student and to prepare for public performances aiming towards professional level.

The module comprises intensive study within the framework of studio teaching and master classes. The module is based on skill and competency of execution. Contact time with individual teachers concentrates on increased repertoire and more advanced skills and technique.
The knowledge is structured within three key areas:
1. Instrumental skills aiming towards technical fluency and mastery
2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The foundations of repertoire and style formed in Technique, Repertoire & Style 1 & 2, as well as development of more advanced skills and technique.
The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teachers interpretation and revision in actual practice.

Syllabus: The module provides progressive tuition, within the framework outlined in Technique, Repertoire & Style 1 and Technique, Repertoire & Style 2.
The ultimate goal of the module is to improve the quality of the music making and artistry demonstrated by the student and to prepare for public performances aiming towards professional level.

The final component of this module is the facilitation of performance tuition to the highest standard.

The module is based on skill and competency of execution. Contact time with individual teachers concentrates on increased repertoire and more advanced skills and technique.
The knowledge is structured within three key areas:
1. Instrumental skills aiming towards technical fluency and mastery
2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The foundations of repertoire and style formed in Technique, Repertoire & Style 1 & 2, as well as development of more advanced skills and technique.
The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teachers interpretation and revision in actual practice.

Syllabus: The module provides progressive tuition, within the framework outlined in Technique, Repertoire & Style 1 and Technique, Repertoire & Style 2.
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2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The foundations of repertoire and style formed in Technique, Repertoire & Style 1 & 2, as well as development of more advanced skills and technique.
The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teachers interpretation and revision in actual practice.
days per week. In this supervised fieldwork placement students will develop competencies in planning and leading sessions with music therapy clients. Students will gain information about the role of the facility in addressing needs of clients and the role of music therapy within the broader operational remit of the facility.

Prerequisites: MU5062

MU5033 - MUSIC THERAPY PRACTICE 2
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: This module is focussed on psychodynamic and psychosocial approaches within music therapy practice including the following areas: adults in mental health contexts, medical contexts and community work, music therapy in addressing the needs of medical patients.

Syllabus: Through a series of expert lectures and self study, students will develop an understanding of psychodynamic and psychosocial approaches within music therapy practice. Core theoretical frames to inform family work, and work with adults in mental health contexts, medical contexts and community work will be presented. Adult mental disorders û major diagnostic categories eg Schizophrenia, Depression and Bi-Polar disorder û will be covered. The role of music therapy in addressing the needs of medical patients will be presented. Students will attend a weekly experiential group. Clinical improvisation skills will be extended.

Prerequisites: MU5211

MU5043 - MUSIC THERAPY PROJECT 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: For students to develop a music therapy research from idea to ethical clearance stage.

Syllabus: Development of research from idea through to ethical clearance. Students will examine issues in research design including choice of data collection methods and methods to analyse data. Students will consider issues around ethics in research, including informed consent, management of sensitive materials, and the role of the researcher in managing participation.

Prerequisites: MU5071

MU5053 - ENSEMBLE 3
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The module involves progressive training in String Chamber Ensemble and String Chamber Orchestra according to the framework outlined in Ensemble 1 & 2.

Goals of the module include public performances and periodic interaction with professional members of the Irish Chamber Orchestra.

The ultimate goal of the module is to improve the quality of the music making and artistry demonstrated by the student within ensemble playing and to prepare for public performances aiming towards professional level and quality.

Syllabus: Contact time in the form of coaching with individual teachers and group projects will focus on an increased development of the repertoire and ensemble skills learned in Ensemble 1 & 2, as well as new and more advanced repertoire. Ensemble 3 will be built upon the consolidation of skills learned in Ensemble 1 & 2, as well as the development of more advanced skills and performance projects.

The materials and repertoire of this module and the balance of the two key segments within each semester will be at the discretion of the programme director and studio teachers based on the distribution of instrumentalists within the student body and the available periods within the work schedules of the Irish Chamber Orchestra.

MU5101 - HISTORY OF ETHNOMUSICOLOGY
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The aim of this module is to provide an overview of the history and the theory of ethnomusicology since the 19th century and to understand its close connections to social and cultural anthropology in order to equip the students with knowledge of the principle theories that have been propounded by ethnomusicologists and with issues currently under debate.

Syllabus: Readings include both exemplary original texts drawn from the history of the field and more recent historical and theoretical overviews. Students are also asked to read and review two book-length musical ethnographies selected from a recommended list of recent works. A 5000 word essay will address a particular topic of the student's choice, designed in consultation with the course director.

MU5211 - CLINICAL ORIENTATION
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: Introduction to Music Therapy concepts and methods as they relate to clinical practice.

Syllabus: The module is focused on the development of practical music making skills related to music therapy practice, observational skills and assessment and
MU5361 - RITUAL CHANT AND SONG PRACTICUM 1  
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The provision of specialist training towards the development of idiomatic performance across a range of vocal repertoires including Western plainchant, Irish traditional religious song, the Western choral tradition and world ritual vocal repertoires.

- the development of skills pertinent to choral / schola singing and conducting / facilitation
- the development of skills pertinent to vocal accompaniment, as appropriate to specialist repertoires.
- the provision of training in sight-singing, aural training and transcription from oral dictation
- the development of a contextual approach to ritual vocal performance

Syllabus: This module will provide specialist vocal training, appropriate to the idiomatic performance of a range of vocal repertoires including Western plainchant, Irish traditional religious song, aspects of the Western choral tradition and selected world ritual vocal repertoires; tuition will include solo vocal technique and repertoire classes; instruction in schola and ensemble singing; conducting and facilitating ensemble performance; vocal accompaniment as appropriate to specialist repertoires; sight-singing and aural training within a contextual approach to vocal repertoires and performance techniques.

MU5411 - ENSEMBLE I  
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: This module takes the student from his/her point of entry and expands on technical mastery and repertoire knowledge with the view of gaining insight into performance styles relevant to musical history and tradition in the classical genre.

The module is based on skill and competency of execution. The student may have to begin the module with extensive revisions in technique and a somewhat different approach to the instrument owing to the pedagogy of the professor involved.

The knowledge is structured within three key areas:

1. Instrumental skills aiming towards technical fluency and mastery
2. Repertoire knowledge relevant to the instrument
3. Stylistic knowledge working towards informed choices of interpretation

The materials and pedagogical direction of this module, because of its one-to-one tuition and highly individualistic approach is open to the teacher/E’s interpretation and revision in actual practice.

MU5401 - TECHNIQUE, REPERTOIRE AND STYLE - 1  
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: The module features training the genre of string chamber ensemble and string chamber orchestra.

An inherent part of any string player’s milieu is the art of ensemble playing. It must be constantly explored and used to be value as an artistic form and musical expression.

Solo playing brings to bear the focus of individual decisions on the music itself. Ensemble playing requires a specialised skill and a particularly developed musical intelligence based on the ability to weigh musical options in the light of other individuals playing in the same continuum.

Goals of the module include public performances and periodic interaction with professional members of the Irish Chamber Orchestra.

Syllabus: The module is structured around two key elements / segments:

1. String Chamber Ensemble
2. String Chamber Orchestra

The String Chamber Ensemble segment aims to develop and hone skills relative to the genre of string quartets, trios, quintets or larger ensemble pieces. Students are expected to work constructively in groups and take responsibility for their individual preparation and the organisation of group rehearsal times. The chamber groups are taught and coached in the context of laboratory work in forms of studio master classes with their respective teachers.

The String Chamber Orchestra segment involves periodic interaction with members of the Irish Chamber Orchestra. The presence of the Irish Chamber Orchestra on the university campus gives young string players an insight into the professional world and working experience of an internationally acclaimed chamber ensemble.

The materials and repertoire of this module and the balance of the two key segments within each semester will be at the discretion of the programme director and studio teachers based on the distribution of instrumentalists within the student body and the available periods within the work schedules of the Irish Chamber Orchestra.

MU5501 - COMMUNITY MUSIC IN CONTEXT  
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: To provide instruction in foundations, history and principles of community, to offer students a brief and broad experience of the field; to combine practical and academic perspectives on Community Music; to offer this programme within an environment sensitive to an ethnomusicological and performance perspective and which encourages cross-platform performance and learning.

Syllabus: History, culture and political developments and issues in Community Music: gender considerations,
 SHIFTING DEMOGRAPHICS, MODELS AND FUNCTIONS OF COMMUNITY MUSIC AND ARTS, DIVERSE LEARNERS AND COMMUNITY CONTEXTS, CASE STUDIES.

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MU5511 - COMMUNITY MUSIC SKILLS I
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: In this module, students will begin to develop the observation, evaluation, communication and teaching techniques and skills necessary for work in community music. While the student’s musical competencies are assumed, this course provides further musical work in ensemble skills.

Syllabus: Teaching and communication skills including role play, modelling, lecture, interactive workshop skills, generative brainstorming; Observation and evaluation techniques including structuring questionnaires, analysing interaction on video, models for documenting generative brainstorming; Observation and evaluation role play, modelling, lecture, interactive workshop skills,

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MU5611 - TRADITIONAL IRISH MUSIC PRACTICUM 1
ECTS Credits: 12

Humanities

Rationale and Purpose of the Module: To encourage creativity and individuality in performance practice; to develop performing skills in the context of individual and group classes; to allow the student under supervision to design and follow a specially prepared music performance programme tailored to his/her musical ambitions and educational needs; to develop ensemble skills.

Syllabus: In this module the student will create and design their own performance programme under the supervision of the course director. Also, students will take tutorials with or tutors on the programme to facilitate their work-in-progress and to provide support for the successful realisation of individual performance projects. This module is in preparation for a public performance

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MU6003 - PRACTICAL SKILLS OF MUSIC 3
ECTS Credits: 3

Humanities

Rationale and Purpose of the Module: To provide further practical guidance in the area of school and classroom music. To develop extra skills specifically related to the facilitation of music learning, teaching, direction and performance. To further develop an awareness in the student of his/her position as a music educator and as a community musician within the entire school community. To further facilitate competency in essential aural, compositional and performance skills.

Syllabus: Students will acquire further skills related to the facilitation and production of music technology in an educational context including sequencing, the use of notation software, and recording, editing and sound production. Students will develop skills in advanced conducting in a variety of contexts. Students will increase their competence specifically in vocal skills, vocal health and in keyboard skills. Students will further develop their skills in relation to musical accompaniment with specific reference to accompanying in a classroom context, in an examination context and in relation to extracurricular contexts in the school. Students will further their skills in relation to musical composition and arranging in a variety of contexts and musical genres. Students will further their competence in their performance of one or more musical instruments appropriate to post-primary education.

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MU6011 - IRISH TRADITIONAL MUSIC STUDIES: THEORY AND PRACTICE
ECTS Credits: 9

Humanities

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MU6031 - PRACTICAL SKILLS OF MUSIC 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide practical guidance in the area of classroom music. To develop skills specifically related to the facilitation of music learning, teaching and performance. To develop an awareness in the student of his/her position as a music facilitator in the school at large. To facilitate competency in essential aural, compositional and performance skills.

Syllabus: This module explores and utilises students’ own performing skills and creative music making abilities in order to address the facilitation and production in the school setting of a variety of music making possibilities. Students will research and explore ensemble music, choral singing, school bands, orchestras, percussion and recorder groups, singing including vocal health, traditional Irish, popular and world musics. Dance, theatre, improvisation, accompaniment, conducting, harmony, counterpoint, composition, melodic and rhythmic writing and recognition will be central in the music lesson. The use of music technology as a teaching and learning tool, and the concept of literacy and numeracy will also provide a focus in practicum. Varieties of teaching and learning styles, classroom, laboratory, performing platforms, the use of ICT and of music technology in the classroom, international perspectives, cultural issues and cross-curriculum aspects are explored in ab sessions.

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MU6041 - MUSIC PEDAGOGY
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To consider topics of pedagogy from the perspectives of specific teaching of music so as to enhance the quality of teaching practice experience. To enable students to undertake structured observation in the classroom. To develop the ability to reflect critically on one’s own teaching and one’s role within the school. To examine aspects of curriculum, methodology and assessment as they relate to music education. To apply current research to practice.

Syllabus: This module facilitates the student teacher’s initial experiences in the school and in the school music department. Junior and Leaving Certificate cycle music syllabi are reviewed, critiqued and addressed in relation to issues of implementation. Transition year music programmes are explored and designed through research and reflection. Structures of subject knowledge, innovation in the classroom, practice room and concert hall/performing platform are addressed. Curriculum development, mixed ability teaching, alternative approaches to assessment and reflective evaluation, and current research are discussed and presented in a variety
of national and international contexts. Varieties of teaching and learning styles, classroom, laboratory, concert hall organisation, the use of ICT and of music technology in the classroom, international perspectives, cultural issues and cross-curriculum aspects are explored in lecture and lab sessions.

MU6051 - ARTS INFORMED RESEARCH 1
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: This course is an introduction to research in the context of music therapy as an arts-dependent practice and covers arts-based research methodology, the research process, skill-development in critical thinking, and research scholarship including writing, presenting and/or discussing research outcomes and current issues in research. As a prerequisite for MU5043, it introduces the beginner researcher to the tools, knowledge and critical thinking required to conduct research in their clinical area of interest.

Syllabus: The study of research methods pertains to an investigation of music therapy as an arts-dependent practice and covers contexts for arts-based research, the research process, skill-development in critical analysis, and research scholarship including writing and/or discussing research outcomes and current issues in research. This course is a prerequisite for MU5043 and introduces the beginner researcher to the tools, knowledge and critical thinking required to conduct research in their preferred clinical area of interest.

NS3201 - MICROBIOLOGY, IMMUNOLOGY AND INFECTION CONTROL
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide the student with a knowledge and understanding of microbiology with application to health care settings nursing and midwifery practice

Syllabus: Micro-organisms Nature of microorganisms and their growth, basic understanding of bacteria, fungi and viruses, general pathogenesis, portals of entry; cycle of infection, basic epidemiology and how an infectious agent is transferred through a population; control of spread of infection, cultivation and identification of pathogens. Pathogenesis in key infections. Infection control in the hospital and community setting, guidelines in isolation precautions. Carrier status amongst health care professionals: practice and developments. Disinfection and sterilisation of equipment. Antibiotics: mode of action in relation to specific diseases; antibiotic resistance; public health measures to ensure antibiotic efficacy: Directly Observed Therapy; reserved drugs; public and professional awareness. Microbiology in relation to nursing and midwifery care and public health awareness: such as HIV, CD, Cl. diff., TB, and MRSA. Immunology: the immune response reviewed; antibody diversity; allergy and anaphylactic shock; the immuno-suppressed patient; immunisation in current public health programmes.

Clinical Skills:
Standard precautions
Introduction to aseptic technique
Specimen observation /collection/testing, labelling, transport (sputum, urine, and blood)
Wound care and wound management
Removal of sutures and clips

NS4013 - HEALTH STUDIES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To provide nurses and midwives with the necessary foundation to develop competence in health education and health promotion.

Syllabus: Concepts of health and ill-health; Measuring health and health science; Determinants of and influences upon health. The social construction of Life styles; The history of health education and health promotion; Models and approaches to improving health; Assessing needs and programme planning; Ethical issues; inequalities, disadvantage and empowerment; Settings for programmes; health policy and politics.

NS4024 - INTRO. TO THE PRINCIPLES AND NATURE OF TEACHING AND LEARNING FOR NURSES AND MIDWIVES
ECTS Credits: 9

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide the students with the teaching skills necessary to facilitate teaching and learning within the nurse practice/learning environment.


Clinical Skills
Microteaching in a clinical setting
Microteaching in a classroom setting
Clinical competencies: assessment/documentation/feedback

NS4037 - PROMOTING SUPPORTING AND PROTECTING BREASTFEEDING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To enable the student to critically consider the promotion, support and protection of breastfeeding. Fulfil the requirements of the Baby Friendly Hospital Initiative including the provision of safe artificial feeding.

Syllabus: Theoretical content: Social, cultural, psychological and political influences on aspects of breastfeeding, infant feeding; National and International Breastfeeding policies and their management, health benefits including BFHI; The importance of breast-feeding to mother and baby, Health care practices that support breastfeeding and artificial feeding;
Counselling skills to support breastfeeding; Anatomy and physiology of lactation, Biochemistry of human milk, Impact of birthing practices on breastfeeding; Breastfeeding facilitation for healthy mothers and newborns; Breastfeeding management under difficult circumstances; breastfeeding management when the mother is ill; Infants with special needs; Alternative methods of infant feeding when breastfeeding is not possible; infant nutrition and weaning practices; Hospital and community support; Drug therapy and breastfeeding, maternal nutrition during lactation, maternal employment and breastfeeding.

Clinical skills Facilitating an antenatal workshop on positioning and attachment for breastfeeding babies. Use of support mechanisms for successful breastfeeding. Breastfeeding under special circumstances (breastfeeding the preterm baby, twins, baby with cleft lip and palate) Facilitating a postnatal breastfeeding clinic. Lactation Consultants role and challenges in protecting breastfeeding. Promoting, supporting and protecting breastfeeding in the community setting

Clinical skills
Communication skills
Positioning and attachment workshop
Breastfeeding under special circumstances (breastfeeding the preterm baby, multiple births, baby with cleft lip and palate) Facilitating a postnatal breastfeeding clinic.
Hand expression, pump expression, cup feeding, breast milk storage; safe formula feeding

NS4047 - PREPARATION FOR PARENTHOOD
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: To enable students to acquire knowledge and understand and implement a programme of skills to work in partnership with parents to support them in their adaptation to parenthood education for childbirth

Syllabus: Philosophy and historical development of childbirth education, Principles of adult education, teaching and learning strategies for pregnancy childbirth and transition to parenthood, health promotion strategies, sexuality and cultural perspectives on childbirth and using and understanding culturally connected teaching strategies, childbirth education for specific social groups e.g. teenagers, travellers. Teaching relaxation in parent education classes., Curriculum development for parenthood education Clinical . Tutorials: micro teaching, presentation strategies and skills Micro teaching Presentation skills Giving feedback, class planning, evaluation of teaching, giving feedback, relaxation techniques

NS4061 - INTRODUCTION TO MIDWIFERY
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: To introduce students to the philosophy, knowledge and skills underpinning midwifery practice

Syllabus: Philosophy, history and regulation of midwifery, practice, - professional identity, accountability and conduct. Principles of individualised and woman centred care, role of the midwife in normal birth. Structure and provision of maternity services, Introduction to midwifery theories, reflective practice and evidence based practice. The role of the midwife in the provision of care in normal pregnancy, birth and puerperium. Introduction to local national and international breastfeeding policies. Principles of effective study skills.

clinical skills syllabus:
Handwashing
Prevention of infection - hand hygiene, standard precautions aseptic technique
Maternal and infant observations and assessment skills including taking & recording vital signs, obtaining and testing urine specimens
Communicating and recording in midwifery practice
Principle of medication management
Introduction to skills required for caring for mothers and babies in the maternity setting
Skills to support parents to care for their baby - infant care practices, hygiene needs and safety

NS4071 - ADAPTATIONS TO PREGNANCY
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: To facilitate students to acquire knowledge and understanding of adaptations to pregnancy from a physiological and psychosocial perspective

Syllabus: Women’s adaptation to pregnancy and childbirth afrom a physiological and psychosocial perspective. Anatomy and physiology applied to childbirth.Confirming assessment, planning, implementation and evaluation of student with the care knowledge and skills to assess, plan, implement and evaluate care of the neonate

NS4063 - CARE OF THE NEONATE
ECTS Credits: 3

Nursing & Midwifery
Rationale and Purpose of the Module: To examine provide the midwife’s role and responsibility in


Clinical skills:
Examination of the neonate at birth including initial steps of resuscitation Ongoing
Checking and use of the resuscitare
On-going assessment and monitoring of the neonate including neonatal vital signs
Care of the neonate, administration of Vitamin K
Breastfeeding practices Formula
Expressing and storing of breast milk
Infant feeding practices Metabolic skills
Newborn bloodspot screening technique

Clinical skills:
Landmarks and diameters of female pelvis and their fetal skull and their application to midwifery practice
Use of support mechanisms for successful breast feeding
Examination of the placenta
Abdominal examination
Initial antenatal visit
Antenatal assessment, monitoring and investigations throughout pregnancy
Fetal assessment, fetal auscultation; application of cardiotocograph and monitoring throughout pregnancy

NS4081 - CONTEMPORARY NURSING STUDIES
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to explore the contemporary issues influencing and informing practice and the evolving role of contemporary nursing in meeting health care needs globally.


NS4201 - BIOLOGICAL SCIENCES 1, ANATOMY AND PHYSIOLOGY
ECTS Credits: 3

Nursing & Midwifery

Rationale and Purpose of the Module: To provide the foundation for understanding the anatomy and physiological functioning of the human system so as to assist in the study of the effects of illness and disease on the individual.

Syllabus: Introduction to the body as a whole, tissues, organs, system, and cavities of the body. Cellular structure, the cell surface, cytoplasm, filtration, and simple diffusion. Tissues: epithelial, connective, muscle and nervous. The Integumentary System: Histological structure and function of the skin and subcutaneous tissue. The Skeletal System: Structure and function of the skeleton, the healing of fractures. Joints: Classification, structure, function. Muscles: Structure and function. The Central Nervous System: Meninges, ventricles and cerebrospinal fluid, blood supply and the brain barrier system, structure and function of the spinal cord, the midbrain, the pons varolii and cerebellum, the cerebrum, medulla oblongata, the limbic system. The Peripheral Nervous System and Reflexes: Classification and anatomy of nerves and nerve fibres, the cranial nerves, the spinal nerves, nerve plexuses, the nature of reflexes, components of a reflex arc. The Autonomic Nervous System: Anatomy of the sympathetic and parasympathetic division, functions of the autonomic nervous system, the adrenal glands, neurotransmitters and receptors.

NS4203 - BIOLOGICAL SCIENCES 3 ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to provide students with a foundation for understanding normal human anatomy and physiological function, considered essential for the later study of illness and disease in the individual.


NS4205 - MATERNITY, PEDIATRIC AND OLDER PERSON NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to facilitate students understanding of maternity, paediatric, and older person nursing so that they may provide appropriate care to individuals and families.

Syllabus: Introduction to the principles of peri-natal care; effects of pregnancy upon maternal health. Nursing care and management of mother and baby introduction to the nursing principles to the care and management of children experiencing acute and chronic illness their experiences of hospitalisation; family centred care; child protection. Dignity, advocacy and protection of the older adult; introduction to the principles of nursing the older person and family/carer across the care continuum. Attitudes towards ageing, and the normal process of aging, age related disorders, e.g. confusion, polypharmacy, falls, dignity, advocacy and restraint. Applied pharmacology.

Clinical Skills
Abdominal palpation
Fetal heart monitoring
Mechanisms of labour
Examination of the baby and child
Bathing a baby
Bottle and breastfeeding
Assessment of the older person - and use of assessment tools
Communication and therapeutic strategies to support the older person with cognitive impairment
End of life care
Last offices

NS4208 - MUSIC IN NURSING AND HEALTHCARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module aims to enhance the student's knowledge of music as a therapeutic medium and potential uses and misuses of music in healthcare environments.

Syllabus: A brief history of the uses of music in
healthcare; an examination of the research literature pertaining to developing students' knowledge of, the uses of music in healthcare environments the role of music in promoting wellbeing in the healthcare environment, and developing students' skills in exploration of and reflection on the sound environment of health care settings in which they have had practical experience, the ability to discern how music can be offered as a creative and positive stimulus to promote positive outcomes for the individuals.

NS4211 - THE ART AND SCIENCE OF NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The module will introduce students to the core concepts underpinning the art and science of nursing, and the professional nature of nursing


Clinical Skills: Introduction to library skills, study methods skills and the presentation of academic material.

NS4215 - SPECIALISED NURSING CARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to introduce students to the role of nutrition in health care and disease prevention so that the specialist needs of a person experiencing dietary difficulties can be addressed

Syllabus: Nutrients, their functions, metabolism, food sources and optimal nutrition for the promotion and maintenance of health and prevention of disease. Absorption, digestion, and vital functions of the macronutrients (protein, carbohydrate and fat) and the micronutrients (vitamins and minerals). Changes in nutritional needs throughout the life cycle including special considerations during pregnancy, lactation, and aging. Nutritional standards, the role of nutrition in disease prevention and clinical nutrition topics including PKU, malnutrition, and dietary recommendations for diabetes. Interventions to maintain nutritional status in illness. Nutrition as an interdisciplinary approach to health care and disease prevention and its application to the individual, in community health and education. Introduction to the use of computer-based diet analysis to evaluate personal dietary intakes. The role of the nurse in meeting the specialist nutritional needs of a person experiencing dietary difficulties. Applied pharmacology.

Clinical Skills Syllabus: Nutritional assessment and management Assisting with oral intake of food and drink Weight management Oral assessment and hygiene Enteral and parenteral, naso gastric and PEG

NS4221 - ADULT NURSING CARE
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This purpose of this module is to facilitate students to the challenges of nursing individuals in the acute hospital and community setting. The process of assessing and identifying needs, planning, prioritising, delivering and evaluating nursing care will be explored. The module aims to discuss evidence based nursing assessment and management strategies supported by current healthcare policies to ensure holistic and safe care for all individuals and their families


NS4218 - COGNITIVE - BEHAVIOUR THERAPY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This purpose of this module is to provide students with a knowledge and understanding of the principles of cognitive behavioural therapy and its application within nursing practice.

maintenance. Pain: Definitions, dimensions, measurement, strategies to support and care for the individual experiencing pain. Introduction to peri-operative nursing care: Elective and emergency surgery; altered homeostasis, peri-operative complications e.g. anaphylaxis, malignant hyperthermia, hypovolaemic and neurogenic shock. Psychosocial aspects of the nursing care of the ill adult e.g. stress, sleep and sensory deprivation, altered body image, role of the family and carer’s. Nursing care and management of individuals experiencing altered skin integrity e.g. wounds, burns, dermatological conditions. Applied pharmacology

Clinical Skills Syllabus:
- Principles of hand hygiene
- Assisting and promoting personal care
- Bed making
- Assessment and maintenance of skin integrity
- Peri-operative care
- Introduction to assessment of levels of consciousness

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**NS4228 - PAIN MANAGEMENT**  
**ECTS Credits: 6**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module offers the student an opportunity to further develop knowledge and understanding of the complexities and challenges of pain management in order to provide additional theoretical support to underpin their practice. The module also aims to build upon the knowledge gained in years one, two and three of the programme enabling the student to address complex care management issues.

**Syllabus:** The multidimensional nature of pain; The physiology of nociceptive and neuropathic pain. The effects of pain physical, psychological and spiritual aspects individual reactions and manifestations; Pain tolerance and pain responses; Barriers to effective pain management.; Interventions to alter sensory input and reduce pain perception. The role of the nurse as a member of the healthcare team e.g. Assessment and measurement of pain planning and implementing pain management interventions and evaluating outcomes. Pain management of groups with specials needs, e.g. child, older person. Applied pharmacology.

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**NS4238 - NURSING ASSESSMENT AND DIAGNOSIS**  
**ECTS Credits: 6**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of this module is to explore and discuss assessment and diagnosis within the nursing process framework and to enhance the student’s existing knowledge of the care planning processes with particular emphasis on person-centred care. Furthermore, the module aims to consider and discuss the most up to date evidence based assessment tools and care planning processes in tandem with current health care policies.

**Syllabus:** Nursing assessment and diagnosis within the nursing process framework. Nursing diagnosis and basic concepts. The development of nursing assessment and diagnosis, issues, types and components. Nursing assessment tools and strategies. used in the different healthcare settings. Current healthcare policies. The formulation of nursing diagnosis and assessment within a clinical practice model.

Manuals of nursing diagnosis, e.g. The North American Nursing Diagnosis Association and the international classification of nursing practice. The care planning processes and systems.

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**NS4305 - NURSING THE CHILD AND ADULT WITH BEHAVIOURAL DISORDER**  
**ECTS Credits: 6**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The aim of the module is to critically evaluate current attitudes policies and practices that support persons with an intellectual disability and associated behavioural or mental health difficulties

**Syllabus:** Human behaviour, adaptive and maladaptive responses Role of the RNID in supporting and assisting the individual with an intellectual disability experiencing mental health difficulties, e.g. phobias, eating disorders, stereotypical, aggressive and violent behaviours. Behavioural and cognitive therapies and the nursing process. Mental health difficulties across the life span. Concept of dual diagnosis in intellectual disability. Nursing care and management of the child and adult with an intellectual disability experiencing mental health difficulties, e.g. phobias, eating disorders, stereotypical, aggressive and violent behaviours; anxiety disorders; psychosexual disorders; perceptual and mood disorders, schizophrenia, depression. Habit and conduct disorders, attention deficit disorders with or without hyperactivity. Applied pharmacology

Clinical skills
- Risk assessment skills of observation and monitoring
- Behavioural management strategies
- Relaxation techniques and arts in the management of anxiety, anger management.
- De-escalation techniques
- Cognitive behavioural therapy

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**NS4315 - NURSING AND ALLIED THERAPIES**  
**ECTS Credits: 6**

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of
this module is to apply and analyse creative mediums which support the development of life skills for persons with an intellectual disability.

Syllabus: The role of the nurse in facilitating and processing diverisonal and recreational activities for persons with an intellectual physical/sensory disability. The role of creative mediums in health promotion, inclusion, choice and empowerment and reflection for people with intellectual disabilities. The use of drama to promote education, skill development and advocacy in the lives of people with an intellectual disability. Occupational and recreational social and self-help skills, for example swimming. Introduction to movement as an educational medium; expressive and creative movement skills for example drama, dance and mime, Creative games in group work. Strategies and techniques for implementing creative sessions for persons with an intellectual disability for example arts and crafts, puppetry.

Clinical Skills
Arts and crafts
Drama
Dance
Mime
Puppetry skills

NS4321 - CONCEPTS AND NATURE OF INTELLECTUAL DISABILITY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module aims to introduce the student to the concept of intellectual disability, nursing practice and a rights based approach to care. and service provision. Within the module the role and contribution of the RNID in caring for people with an intellectual disability is integrated and cognisance is paid to the ever changing paradigm shifts of service ideologies and healthcare provision.

Syllabus: Concepts of impairment and disability: its incidence, causation manifestations, classification criteria and terminology; Differentiation between intellectual disability and mental illness; Historical development of nursing practice, service provision and approaches to nursing care (e.g. holism, person-centred). The role and function of the nurse as a healthcare professional, member of the multi-disciplinary team in wider healthcare service. Organisational philosophy and ethos of service providers., nurse-client relationship and communication. Theory and application of the principles of normalisation, deinstitutionalisation, empowerment and advocacy. Effects of disability on the nuclear, extended family and society.

Clinical Skills Syllabus:
- Principles of hand hygiene
- Assist with bathing/bed making
- Personal hygiene
- Promotion and maintenance of elimination
- Safe positioning of clients
- Assessment and maintenance of skin integrity

NS4323 - NURSING ADOLESCENTS AND ADULTS WITH INTELLECTUAL DIS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is for each student to develop knowledge and skills required to support the person with an intellectual disability through adolescence and adulthood with their family.


Clinical Skills Syllabus:
- Catheterisation, enema/suppository administration and stoma care
- Assess living skills
- Life skills development
- Interpersonal relationships and sexuality: sex education

NS4405 - MENTAL HLTH NURSING AND SPECIAL CLIENT GROUPS DISORD
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of the module is to introduce students to the historical development of nursing within mental health care. To
provide an overview of current mental health/psychiatric nursing practice within healthcare settings. Introduce the student to mental health nursing specific terminology, mental health disorder classifications and the Mental Health Act 2001.

**Syllabus:** Origins and developments of mental health nursing within the context of contemporary nursing practice. Introduction to the philosophy, theories, and models of mental health nursing e.g. institutionalisation and normalisation, person-centred care, recovery. Role of the mental health nurse in a variety of health care settings. Incidence, prevalence, classification, and models of mental health/illness. Promotion and maintenance of safety in practice settings

**Clinical Skills**
- Introduction to skills of engagement
- Admission procedures and legal requirements
- Introduction to care planning
- Principles of hand hygiene
- Assisting and promoting personal care
- Bed making

**NS4423 - ALTERED HOMEOSTASIS AND MENTAL HEALTH**
**ECTS Credits:** 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of this module is to develop Mental Health students appreciation of the importance of a holistic approach to patient care and to develop knowledge and understanding of physical illnesses which are common in mental health care.

**Syllabus:** The inter-relationship between mental and physical health. The physical health status of persons with mental illness. The role of the nurse in promoting the health of this service user group. The aetiology, signs symptoms, treatment and nursing care of physical illnesses which commonly present in mental health care e.g. diabetes, thyroid disorders, respiratory and circulatory disorders, urinary tract infections, incontinence and constipation. Somatoform disorders: presenting features and nursing care of persons with somatoform disorders. Applied pharmacology.

**Clinical Skills**
- Catheterisation, catheter care, catheter removal.
- Stoma care
- Enemas, suppositories
- Blood glucose monitoring and techniques in insulin administration
- Assessment and Maintenance of skin integrity
- Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
- Breast awareness

**PA4012 - PARA-GOVERNMENTAL ORGANISATIONS**
**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** To analyse and explore the role and functions of Paragovernmental Organisations (PGO) as instruments of 'indirect' public administration generally and within the context of the politico-administrative system in Ireland.

**Syllabus:** Part A: Paragovernmental Organisations as instruments of indirect administration; State-sponsored Bodies (SSBs) as manifestation of the PGO type in Ireland; commercial (public enterprise) and non-commercial (administrative agency) SSBs; legal, structural and financial characteristics of SSBs; roles of minister, board, management and Houses of the Oireachtas in the structure of accountability of SSBs. The evolving regulatory environment of SSBs. Part B: Economic rationale for government intervention in the economy and the role of public enterprise; review and performance evaluation of public enterprise in Ireland since the foundation of the state; major concepts and trends in the regulation of public enterprise; privatisation and public private partnerships generally and in Ireland

**PA4017 - SUB NATIONAL GOV. IN EUROPE:CHALLENGE AND CHANGE**
**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** Using a comparative and thematic approach (within a Joint European Module subscribed to by 11 European universities) this course aims to explore various systems of sub-national government, the changing relationships between the different levels of government and to examine the origin, nature and implications of the challenges facing sub-national governments in Europe.

**Syllabus:** The salience of sub-national government; evolution of different forms of subnational government; differences between supra-national, national and subnational government and relationships between the different levels of government; theoretical perspectives on the study of sub-national government; state, region and locality in the Anglo, French, Germanic and Scandinavian traditions; recent developments in Central and Eastern Europe; the European dimension of sub-national government; comparative trends in reform; the current challenges and future prospects confronting sub-national governments

**PA4021 - IDEAS AND CONCEPTS IN PUBLIC ADMINISTRATION**
**ECTS Credits:** 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** Aims: This foundation course aims to introduce students to the ideas and concepts used in the study of Public Administration.

**Objectives:**
- To provide an overview of the different principles and theoretical perspectives applied to the study of public administration and underlying recent changes in the scope and management of the public sector
- Indicate the significance and shortcomings of each school of thought
- Illustrate working examples of the various models in different state settings and the challenges facing public administration in the 21st century
- Highlight that accountability and ethics are core values in public administration

**Introduce students to the career development skills module**

**Syllabus:** Public Administration as a field of study; identity, interdisciplinary character, profession, differences between public management and public governance; growth and role of government; development of civil service systems; origins and theoretical pillars of traditional model of public administration û Northcote Trevelyan Report, Pendleton Report, Max Weber, Woodrow Wilson, organisational theory; politics-administration dichotomy in Europe; demise of traditional model of public administration; managerialism, entrepreneurial government and public choice theory; New Public Management; results of public
sector reforms; accountability; ethics; e-government; globalization.

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**PD4003 - ERGONOMICS FOUNDATION**  
ECTS Credits: 6  
Design and Manufacturing Technology

Rationale and Purpose of the Module: Upon completion of this module students will be able to:  
- Explain the ergonomics approach.  
- Compute basic statistical metrics to describe inter individual differences in physical and cognitive abilities.  
- Apply statistical data describing populations abilities in the design of products or work systems.  
- Explain the physiological basis of energy liberation in the cardiovascular system.  
- Understand the basis for human motor control and be able to explain and apply Fitts equation.  
- Derive an expression to explain information processing rates in humans and apply the theory in the design of displays and controls.

**Syllabus:** History of Ergonomics  
Domains of specialisation in ergonomics.  
Human variability and user fit, anthropometry, conducting anthropometric surveys, fitting trials, the normal distribution and statistical aspect of variability, standards in anthropometry.  
Minority groups, needs of older and younger people, user centred design, inclusive design, design for all.  
Biomechanics of body forces, hand tool design, internal and external forces of the upper limb, muscle fatigue, endurance models, modelling fatigue.  
Psychophysical studies of user physical interaction, theories of comfort and discomfort, repetitive strain injuries, conducting studies, Ethics and user studies.

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**PD4005 - ADVANCED MODELLING OF FORM**  
ECTS Credits: 6  
Design and Manufacturing Technology

Rationale and Purpose of the Module: The module aims to develop students skills in expression of organic form in a 3 dimensional digital environment. Enhancing these skills will further augment the learners appreciation of complex 3D form and downstream uses of Computer Aided Design in manufacturing, rapid prototyping & digital representation & visualisation.

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**PD4101 - DESIGN STUDIO 1**  
ECTS Credits: 6  
Design and Manufacturing Technology

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, Design Methods, Design Techniques and Design History. These combine to introduce the student to the designed product in total taking into account practical considerations, aesthetics and social conditions.

Design Methods:  
- An introduction to basic design skills - An approach to design  
- Working to a brief - introduction to various design processes - Working to a time schedule - Stimulating the imagination through design projects - Introducing Conceptual 2D and 3D design and an introduction to creative thinking techniques - basic design and manufacture relationships - An introduction to problem solving - An introduction to ergonomics - Basic user research - An introduction to low fidelity prototyping model making skills - The development of the manual and cognitive skills of idea development and communication.

Design Techniques:  
- An introduction to drawing, illustration and rendering skills - perspective, form understanding and construction - an introduction to orthographic technical drawing - practical development of the manual and mental skills of idea development and communication - Both formal and informal techniques - Emphasis on fluidity and speed - An introduction to 2D and 3D shape and form development through the use of tone and colour using rendering media including felttipped pens, pencils, pastels, gouache and markers - an introduction to visual communication for design- fundamentals of presentation techniques and graphic layout.

Design History:  
- An overview of industrial design in the context of social and economic conditions (from Ancient Civilisations to the Contemporary Practice). Discussion of how design style and design problem solving have to compromise to reach optimal solutions.

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**PD4105 - DESIGN STUDIO 5 (INDUSTRY)**  
ECTS Credits: 6  
Design and Manufacturing Technology

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 through a series of industry focused projects. These projects, conducted with Industry partners will bring the students through the entire design process from early research and conceptualisation to final design and design for manufacture. The real-world problems will focus on professional practice, current industry requirements and emerging technological trends.

To equip students with the skills and capacities to creatively solve real world problems across a wide variety of fields.

To introduce tools, techniques and methods applicable to innovation and industrial demands.

To practically apply the design process to develop and realise design ideas to a professional standard.

To develop and advance design skills in emerging market areas including medical devices, consumer products and electronics.

To expand student knowledge and practical application of mechanical reasoning, manufacturing and materials, and design detailing.

To develop critical thinking skills and complex problem solving abilities.

To develop advanced design skills, including real-world research, ethnography, sketching, model-making, design visualisation, professional practice, communication, prototyping and user testing, advanced human factors.

The teaching model will predominantly be a ‘learning by doing process, where a mix of lectures, projects, workshops and design projects will blend to provide students with a mix of practical and applicable professional skills. This approach will teach students core skills needed to identify new opportunities, abstract problems, generate and develop a wide range of solutions, as well as building and realising the most appropriate solutions.

**Syllabus:** Project based studio classes.

Integration and practical application of various different design processes.


Design Research Skills: Ethnography, User Experience, Real-world research, synthesis of information, Research synthesis and analysis.

Creativity, brainstorming, design thinking.

New Product Innovation, Project Planning.


Design for Sustainability.

Aesthetics, Understanding of form, Design Acuity, Emerging markets and trends.

Technological trends.

Design for Manufacture.

Product Marketing for design.

Communication, visual and verbal.

Problem solving and Innovation.

Design for Professional Practice.

**PD4115 - DESIGN STUDIO 6 (COMMUNITY)**

ECTS Credits: 6

**Design and Manufacturing Technology**

**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).

To introduce tools, techniques and methods applicable to innovation and effective problem solving.

To develop the skills and capacities for effective team working.

To demonstrate to students the link between design and user behaviour.

To advance design skills, including research skills, sketching, model-making & prototyping, design visualisation, presentation, communication and user testing.

To explore and implement complex real-world research techniques to gather information, and then to apply tools to synthesise, analyse and transform the information into usable design guides.

To allow students to integrate all stages of the design process.

To introduce students to the tools, concepts and techniques underpinning Service Design, Universal/Inclusive Design and Design for Social Innovation.

To introduce students to responsible design practice (ethics, social & cultural inclusion, diversity of practice).

To develop skills in systems thinking and critical analysis.

Learning by doing is the predominant teaching model with a combination of projects, workshops, field trips and lectures to introduce students to the complex topics behind understanding and designing for user and societal needs. The practical approach encourages students to address problems from different and holistic perspectives as well as generating and realising the most appropriate solutions to current contemporary problems.

**Syllabus:** Project based studio classes.

Advanced design skills.

Integration and practical application of various different design processes.

Design thinking: Tools and processes of design

Collaboration: Collaborative Work, Team work, Project Planning and management skills. Interdisciplinary and Multi-disciplinary teams. Team Dynamics and Group work.

Advanced aesthetics and form understanding.


Information Gathering, synthesis and delivery

Strategy: human centred approach, Systems Thinking.

Integrative thinking, First Principles.


Communication: Professional presentations skills.


**PH4003 - MECHANICAL ENERGY**

ECTS Credits: 6

**Physics and Energy**


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.
PH4007 - SOLAR AND NUCLEAR ENERGY
ECTS Credits: 6

Physics and Energy
Solar energy and conversion, solar radiation, net radiation flux at the Earth, basic principles of energy conversion. Photovoltaic conversion, solar electricity generation, photovoltaic electric principles, photovoltaic system wiring, batteries, photovoltaic controls. Energy supply systems, simulation of system performance, photovoltaic power production, sizing photovoltaic systems.


PH4011 - PHYSICS FOR ENGINEERS I
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: The module is an introductory physics course covering Mechanics, Heat, Electricity and Magnetism for engineering students.


PH4013 - EARTH SCIENCE
ECTS Credits: 6

Physics and Energy

The origin of the universe, formation of hydrogen and heavier atoms, formation of rocks and minerals. Quantification of resources: minerals, oil, gas, coal, wind, biomass, marine energy. Theory of Peak Oil and the Hubbert Curve. The Solar System: the Earth’s relationship to the Sun, Moon and other bodies of the solar system. Earth, air and water interactions: The structure and composition of the atmosphere. The effects of atmospheric convection, atmospheric dust and cloud cover, rotation of the Earth on global climates and seasons. The radiation, conduction and convection and their effects on weather and climate. Transfer of heat energy to the patterns of wind belts. Moisture, clouds and precipitation. Running water and groundwater. Oceans past and present: Transfer of solar energy to ocean currents and waves. Climate modelling; Collection and use of data to predict the weather. Climate changes that have occurred over the millennia.

PH4021 - PHYSICS OF SOLIDS
ECTS Credits: 6

Physics and Energy

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.


Prerequisites: PH4171, PH4042

PH4027 - WIND, OCEAN AND HYDRO ENERGY
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: This module is proposed to supplement existing modules in the creation of the BSc Energy. This interdisciplinary module seeks to introduce students to wind, ocean, hydros and other renewable energy sources and equip them with the knowledge, and analytical skills necessary to advise on their appropriate use.

Syllabus: Renewable Energy Technologies in the Past, Present and Market. Review of energy conversion principles and devices, electric generators (principle of
Hydro (pressure head systems, dams, pumped storage, tidal barrages), Wave energy devices (principle of work, classification), Tidal stream devices (principle of work, classification) Ocean current devices (principle of work, classification) Offshore wind (principle of work, classification), Energy farms installation operation, Storm defence Ocean Energy Non Renewable, off-shore oil & gas, exploration, drilling, distributed fields, flexible risers, offshore industry technology - sonar and seismic, underwater technology - ROV- AUVs, pipelines, production platforms survey vessels. Marine hydrates


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PH4031 - PHYSICS FOR GENERAL SCIENCE 1
ECTS Credits: 6

Physics and Energy

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.

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PH4037 - ENERGY RESOURCE ASSESSMENT
ECTS Credits: 6

Physics and Energy


Problem-based learning: Wind example, hydro example, biofuel example. Macro energy resource assessment and planning at regional and national level.

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PH4041 - OPTICS
ECTS Credits: 6

Physics and Energy

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.


Prerequisites: PH4102

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PH4051 - MEASUREMENT AND PROPERTIES OF MATTER
ECTS Credits: 6

Physics and Energy

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.


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PH4061 - QUANTUM MECHANICS
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: The purpose 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.

Prerequisites: PH4171, PH4042, PH4132

**PH4071 - SEMICONDUCTORS 1**
ECTS Credits: 6

**Physics and Energy**

**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, Moores 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. Electric 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, photore sist), 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

**PH4081 - NANOTECHNOLOGY 1**
ECTS Credits: 6

**Physics and Energy**

**Rationale and Purpose of the Module:** The aim of this 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.


Prerequisites: PH4061, PH4021

**PH4082 - FIBRE OPTICS AND OPTOELECTRONICS**
ECTS Credits: 6

**Physics and Energy**

**Rationale and Purpose of the Module:** The aim of this course is to develop and extend the students knowledge of the principles of fibre optics and introduce the students to contemporary optoelectronics.

Optical modulators and switches: electrooptic effect, titanium-diffused LiNbO3 technology, quantum-well electroabsorption modulators. Optical amplifiers.

Prerequisites: PH4041

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**PH4091 - PHYSICS OF MODERN MEASUREMENT**  
ECTS Credits: 6

**Physics and Energy**

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, Bragg's 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, PH4041

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**PH4097 - MATHEMATICS AND PHYSICS PROJECT 1**  
ECTS Credits: 6

**Physics and Energy**

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**PH4131 - MECHANICS/HEAT/ELECTRICITY/MAGNETISM**  
ECTS Credits: 6

**Physics and Energy**

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.


Electricity: charge, electric field, Coulomb's law, Gauss's law. Electric potential, capacitance, Ohm's law, Kirchhoff's 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.

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**PH4161 - ATOMIC / MOLECULAR / LASER PHYSICS**  
ECTS Credits: 6

**Physics and Energy**

Rationale and Purpose of the Module: This module develops the student's knowledge of atomic and molecular physics, particularly 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.


Prerequisites: PH4132, PH4041

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**PH4171 - MECHANICS**  
ECTS Credits: 6

**Physics and Energy**

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.

Physics and Energy

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.


Prerequisites: PH4061

PH4613 - FORCES, POTENTIALS AND FIELDS
ECTS Credits: 6

Physics and Energy

PH5041 - CONDENSED MATTER PHYSICS 1
ECTS Credits: 6

Physics and Energy

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.

**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, Bragg's 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).

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**PH5098 - SEMICONDUCTOR PROCESSING 1**  
**ECTS Credits:** 6  

**Physics and Energy**

**Rationale and Purpose of the Module:** The purpose of this module is to 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.


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**PH5102 - OPTICAL FIBRE AND OPTOELECTRONIC SYSTEMS**  
**ECTS Credits:** 6  

**Physics and Energy**

**Rationale and Purpose of the Module:** The aim of this course is to develop and extend the students knowledge of the principles of fibre optics and introduce the students to contemporary optoelectronics.

**Syllabus:** Fibre Optics. Dielectric waveguides: TE and TM modes, condition for guided waves, modal field patterns, acceptance angle and numerical aperture. Modes in optical fibre: weakly guiding approximation, linearly polarized modes, normalized frequency, single-mode fibre.

Light attenuation in fibres: losses due to material
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.

PM4027 - SOCIAL PSYCHOLOGY OF ORGANISATIONS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This 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 understanding of 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
Personnel & Employment Relations

**Rationale and Purpose of the Module:** To enable students to have an overview of the evolution and contemporary nature of Irish employment relations. To ensure students are cognisant of the demands which dismissals and equality law employment places on companies at workplace level.

To enable students to understand the nature of discipline and grievances procedures at the level of the workplace.

To enable students to analyses cases and to develop report writing skills.

To understand the role of national partnership in wage determination.

**Syllabus:** Collective and individual approaches to studying and managing the employment relationship. The role and function of trade unions and employer organisations in a societal and organisational context.


**PM4067 - CONTEMPORARY ISSUES IN ORGANISATIONAL BEHAVIOUR**

ECTS Credits: 6

**Personnel & Employment Relations**

**Rationale and Purpose of the Module:** This module provides an arena for an advanced analysis of organisational behaviour and theory. It explores emerging and topical themes and issues arising in the field of organisational studies and encourages students to investigate organisational dynamics using a variety of different definitions and perspectives.

**Syllabus:**
- Introduction: Revisiting OB: what it is, what it is not, and how we might alternatively conceptualise it; Dimensionalising Employee Engagement and its impact on behaviour at work; Ethics, ethical cultures and unethical behaviour: consideration for managing organisational behaviour globally; Diversity in Organisations, national and international perspectives and dilemmas; Emotion in Organisations, nature and consequences; Trust in Organisations, Antecedents, Forms, Conditions and Breaches; Justice in Organisations, Types, Range and Consequences.
- Collective and individual approaches to studying and managing the employment relationship.
- The role and function of trade unions and employer organisations in a societal and organisational context.

**PM4045 - THEORETICAL PERSPECTIVES ON EMPLOYMENT RELATIONS**

ECTS Credits: 6

**Personnel & Employment Relations**

**Rationale and Purpose of the Module:**
- To enable students to have an overview of the evolution and contemporary nature of Irish employment relations.
- To ensure students are cognisant of the demands which dismissals and equality law employment places on companies at workplace level.
- To enable students to understand the nature of discipline and grievances procedures at the level of the workplace.
- To enable students to analyses cases and to develop report writing skills.
- To understand the role of national partnership in wage determination.

**Syllabus:**
- Collective and individual approaches to studying and managing the employment relationship.
- The role and function of trade unions and employer organisations in a societal and organisational context.

**PM4063 - EMPLOYEE RELATIONS FOR ENGINEERING AND SCIENCE**

ECTS Credits: 6

**Personnel & Employment Relations**

**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:**
- Collective and individual approaches to studying and managing the employment relationship.
- The role and function of trade unions and employer organisations in a societal and organisational context.

**PM40411 - INTRODUCTION TO GOVERNMENT AND POLITICS**

ECTS Credits: 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:**
- This module provides an introduction to the study of politics and establishes a foundation for other politics modules that may be taken by students in the future.
- It is intended as a practical guide to some of the main concepts and vocabulary of political science.
- As such, the module provides an introductory guide to important themes and issues related to the study of politics, such as the state, regime types, and political change and behaviour.
- It also introduces students to some of the study skills that they need to complete assignments and assessment in the area of politics.

**Syllabus:**
- The module is taught through a combination of lectures, classes and on-line exercises that each introduce students to justifying power: the legitimation of authority; The origins of the modern state; researching politics; Essays and essay conventions; State and its critics; State failure and its problems: revolution; State failure and its problems: state failure in the modern world; Democracy - the basic principles; Democracy - the basic types; Where does democracy come from?; Forms of democratic government and their outcomes; Political parties and their functions; Electoral systems and parties; Pressure politics in democracies: who has influence and why? Non-democratic regimes - authoritarianism, totalitarianism and the rest.
- Concepts and methods of political analysis including

**PM40418 - INTERNATIONAL RELATIONS**

ECTS Credits: 6

**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 Organisation and the global economy

Syllabus: The module provides an introduction to 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 Organisations

PO4023 - COMPARATIVE EUROPEAN POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This course provides an introduction to 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 commonalities and, secondly, the particularities, of politics and government among West European states 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 politics 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 both of which are areas of study in third-year courses.

Prerequisites: PO4011

PO4033 - POLITICAL THEORY
ECTS Credits: 6

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

PO4041 - THE POLITICS OF OIL
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module looks at the domestic and international politics of oil production and consumption. The module introduces students to the role that oil has played in the development of the international system, how it has shaped political institutions and conflicts in contemporary states, and what policy issues will emerge over the next few decades if predictions about peak oil prove to be true. In doing so it introduces students to key debates and concepts in contemporary comparative and international politics such as the resource curse, rentierism, and new wars.

Syllabus: 1. The hydrocarbon age the emergence of oil as a driver of modern political and economic growth and the development of oil as a strategic resource; 2. petroleum and the organization of capitalism; 3. the international organization of the petroleum economy: OPEC; 4. oil wealth and regime survival: the monarchical rentier state and the issue of whether oil help autocracies to endure; 5. theoretical perspectives on the resource curse: does oil hinder democracy and growth?; 6. case study of the resource curse: Venezuela; 7. case study of the resource curse: Nigeria; 8. case study of the resource curse: Russia; 9. oil wars: resource rents and conflicts; 10. case studies of oil wars as forms of new wars; 11. the contemporary geo-politics of oil; 12. peak oil and beyond the policy problems of the transition to the post-oil age.

At a practical level, this course aims to: Introduce students to the government and politics of Ireland Develop analytic and evaluative skills for examining the processes of government and politics Understand the historical and political development of the Irish state, and be able to identify key influences in that development; Be familiar with key institutions and their workings;

Syllabus: The module will contain three main components: the institutional framework of government and administration the executive, legislature and bureaucracy; political behaviour including government, parties, party system, electoral behaviour and political culture; and an analysis of the public administration and policy making looking at territorial administration and sub-national government, economic policy-making and the advent of partnership government; the welfare state and social policy; plus Ireland’s role in the EU and beyond.

PO4043 - INTRODUCTION TO IRISH POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This course is designed to build on and develop the knowledge gained in earlier politics modules by examining the politics and society of a single country in more depth. The course will apply a range of alternative analytical perspectives from political science and the sub-disciplines of political economy, political sociology, public administration and public policy, to the study of the government and politics of Ireland.
Rationale and Purpose of the Module: In this module students will address debates about the causes and nature of nationalist politics and ethnic conflicts. They will explore the ways in which historians and political scientists have sought to explain the capacity for national movements and ethnic identities to mobilise and unite people who may among themselves have sharply contrasting objective interests. A key aim of this module is to enable you to take general theories - in this case those that explain nationalism and ethnicities - and to use them critically, testing their validity, and if necessary, introducing your own modifications and qualifications to these theoretical generalizations.


PO4107 - NATIONALISM, ETHNICITY AND CONFLICT
ECTS Credits: 6

Politics and Public Admin

PO4117 - POLICY-MAKING IN THE EUROPEAN UNION
ECTS Credits: 6

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 programmes 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 particular 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 policy-making
- Theories of European integration and policy-making
- Agenda-setting
- EP decision-making
- Council decision-making
- Bicameral bargaining
- Transposition and implementation
- Enforcement and judicial review
- Evaluation

PO4127 - REGIONALISM IN WORLD POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: The proposed module better reflects the subject expertise of current teaching staff in this area and curriculum in the BA Politics and International Relations. It will be scheduled in place of the existing module PL4017 'Regional Development' as a core second year module for BA Politics and International Relations. The module will be added to the elective choice for students in semesters 7 and 8 on AHSS programmes where Politics is offered as an option.


PO4108 - MULTICULTURALISM AND POLITICAL THEORY
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module takes up some contemporary themes in political theory, examining the concepts of justice, freedom, equality, democracy, pluralism and respect in light of the demands for greater recognition and accommodation that have been put forward by ethnic, racial, religious, and linguistic minorities. The aim of this module is to explore the formidable problems raised by the challenge of cultural diversity from the perspective of normative political theory, and in particular to evaluate the a range of alternative justifications for multicultural political policies. By the end of the module, students should be aware of the various rights claims, policy proposals and political alternatives that have been suggested by and on behalf of minority cultural communities; have a sense of the challenges these pose to established liberal theories and to liberal-democratic practices; be able to critically evaluate the various justifications offered; understand a range of arguments for and against

Syllabus: Multiculturalism and Political Theory; Pluralism; Citizenship; Tolerance; The Politics of Recognition; Liberal Culturalism; Cosmopolitan Criticisms; Feminist Objections; Democracy and Minority Representation; Education and Cultural Diversity; Headscarves; Universalism, Ethnocentrism and Relativism

PO5004 - GRADUATE SEMINAR IN DEVELOPMENT
ECTS Credits: 9
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; 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.

PO5013 - CONFLICT ANALYSIS
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: This module will undertake a comprehensive review of the literature on armed conflict in the international and domestic arenas. Much of this literature is from the field of political science but this module will also draw upon insights from other disciplines. Students will analyse leading and critical theories of armed conflict, their variables, their causal claims, and, of central importance, their ability to explain contemporary and historical cases of conflict and predict possible future conflicts. This survey of the literature on this topic will utilize scholarship employing both qualitative and quantitative methodologies. This module is designed primarily for postgraduate students who seek to understand (and, through their own scholarship, contribute to) the literature on armed conflict.

Syllabus: Defining war and other forms of armed conflict.
Levels of analysis.
Individual level theories of armed conflict: misperception theory, evoked sets, national role conceptions, historical analogies, prospect theory
Group level theories of armed conflict: organizational process model, group think, bureaucratic politics model
State level theories of armed conflict: democratic peace theory, diversionary war theory, death watch theory, public opinion-based theories, regime-based theories
Systemic level theories of armed conflict: neorealism, hegemonic stability theory, balance of power theory, offensive-defence theory, cultural realism, power preponderance theory, status discrepancy theory, power transition theory
Environmental theories of armed conflict: greed-based theories vs. grievance-based theories, environmental degradation-based theories, environmental disaster-based theories.
Theories of genocide and the motivations for humanitarian interventions.
The future of wars and other armed conflicts.

PO5014 - MULTI LEVEL GOVERNANCE: CONCEPTS AND PRACTICE
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: The aim of this module is to enable students to understand the significant changes that have taken place in processes of governing at international, national and local levels. The module explores the manner in which the interaction of various levels and the involvement of diverse actors have impacted on politics, policy and polity. The meanings, origins and various applications of the phenomenon of multi-level governance (MLG) are analysed in order to assess its normative and empirical impact. Particular attention is paid to the emergence of MLG as a significant framework of policy-making in the EU as well as its effects on domestic and global contexts.

Syllabus: This module explores the distinctions between government and governance and considers the conceptualisations and implications of MLG. Topics include: Government and governance; new modes of governance; MLG, theory or explanation; MLG as compound democracy; MLG in the international policy arena (e.g., climate change, finance, tobacco control); MLG in the EU; MLG in the domestic context. The topics will be considered from both theoretical and applied perspectives and will direct students to the vast array of interpretations and applications of the MLG phenomenon.

PO5015 - GRADUATE SEMINAR IN CONTEMPORARY POLITICAL THEORY
ECTS Credits: 9

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 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

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

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.

PR4010 - ANATOMY 1
ECTS Credits: 12

Clinical Therapies

Rationale and Purpose of the Module: This module is designed to enable students to understand the structure and function of the musculoskeletal system of the lower extremity, pelvis and spine; abdomen; the cardiovascular system and the respiratory system. This module forms the basis for understanding the implications of pathophysiological changes within these structures that will be studied in modules during years 2-4.

The total hours scheduled will be 96 (based on 3 hours lectures, 3 hours labs and 2 hours tutorials over 12 weeks)

Syllabus: Introduction to nomenclature and general concepts of anatomy, classification of bones, joints and muscles; cervical, thoracic and lumbar spine and thorax (sternum, ribs and thoracic vertebrae). The integumentary system (structure & function). Afferent and efferent control of muscle tone and posture; myotomes and dermatomes and reflexes LL; pelvic bones and pelvic floor and perineum ; bony skeleton, muscle attachments, joints, nerve supply of the lower limb, analysis of movements of the lower limb, muscle participation and nature of contraction.

PS4011 - SOCIAL PSYCHOLOGY 1
ECTS Credits: 6

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.

PS4021 - PSYCHOLOGY: THEORY AND METHOD 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: This module provides students with a broad introduction to the historical evolution, issues, debates, themes and theories in psychology. The course will provide 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.

PS4022 - PSYCHOLOGY OF THE PERSONALITY
ECTS Credits: 6

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.

Prerequisites: PS4032, PS4031
**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

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**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.

**Prerequisites:** PS4042, PS4021

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**Rationale and Purpose of the Module:** The specific focus of this module is political psychology. Political psychology is an interdisciplinary area of psychology. The course provides an introduction to the psychological foundations of political life. Psychological theories are applied to particular political problems including the formation of belief systems, moral reasoning and ideology, colonialism, political socialization, political culture, mass hysteria, psychohistory. In doing so, it is demonstrated how psychology informs political behaviours and actions, the behaviour of politicians and the effects of social and political structures on behaviour.

**Syllabus:** The role of research designs in political psychology. Students will get a good understanding of advanced research designs and how they can be developed for experimental and non-experimental psychological research, in both basic and applied research domains. Besides providing the necessary knowledge about advanced research designs, this module seeks to prepare students for their own research (i.e., their Major Research Project).

**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:** This module covers the rationale of methods in both basic and applied research. Students will learn how to investigate research questions by using the appropriate research designs. Pros and cons of several research designs will be discussed. Specifically, we will discuss the merits of experimental methods, non-experimental methods, qualitative methods, implicit methods, explicit methods, computer simulations, and mixed-methods approaches. Besides teaching students the rationale of advanced research designs, this module...
seeks to teach students the tools that may need for their own research.

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**PS6061 - PROFESSIONAL SKILLS IN PSYCHOLOGY**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** The aim for this module is to improve students writing skills.

**Syllabus:** This course is the second part of a two-course sequence on professional skills. In order to successfully communicate research, students need to train their writing skills. In this module, students want to improve students writing skills by means of giving good examples for writing styles and by giving students feedback on their writing skills. Consistent with the purpose of the module, it is intensive in writing.

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**PS6071 - SOCIAL INFLUENCE AND ATTITUDE CHANGE**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** The aim of this module is to give an overview to social influence and attitude change processes. An emphasis is given to the applicability of social influence and attitude change strategies to specific social contexts (e.g., advertisement, work environment, interpersonal, and inter-group relationships).

**Syllabus:** Social influence and attitude change are two core issues in psychology. Human interactions involve different forms of social influence and changes in attitudes. In this module we will examine basic cognitive and affective levels as well as the more social levels (e.g., groups) which determine social influence and attitude change. We will review important, representative contributions to social influence and attitude change. We will provide a historical perspective on the development of theories and paradigms in these areas of research. In addition, we will discuss with students whether and how the prominent theories on social influence and attitude change can be applied to everyday life situations.

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**PS6081 - PROBLEM SOLVING AND DECISION MAKING**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** The aim of this module is to provide in-depth knowledge on typical strategies that people use in problem solving and decision making and how solutions to problems and decision can be improved. This module will provide a deep understanding of problem solving and decision making and it will increase the students analytical skills.

**Syllabus:** People solve problems and make decision all of the time, but only sometimes do people succeed. In this module, students will learn about the prominent theories and applications in problem solving and decision making. We will touch on different kinds of problems and decisions (personal, inter-personal, group context) in different contexts (e.g., relationships, economics). We will contrast typical strategies that people use to the strategies that would make problem solving and decision making more effective and efficient.

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**PS6091 - CLINICAL MODELS OF PSYCHOLOGICAL DISORDERS**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** Clinical psychology is the study of psychological disorders and distress. The aim of this module is to give an understanding of psychological disorders and distress, and how their occurrence and persistence can be explained with prominent clinical models of disorders.

**Syllabus:** The module will provide a valuable introduction to key issues and concepts in clinical psychology. Students will be introduced to prominent psychological disorders (e.g., anxieties, dissociative and somatoform disorders, mood disorders, schizophrenia, personality disorders). The module will also focus on historical and recent approaches that explain the development and the persistence of these disorders. These perspectives will include, for example, psychodynamic, behavioural, cognitive, and systemic approaches. The validity of these clinical models will be discussed by considering up-to-date research in clinical psychology. The lecture series will provide overviews to the topics and the tutorials will allow for in-depth discussions of clinical models of psychological disorders in class.

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**PS6101 - PERSONALITY AND INDIVIDUAL DIFFERENCES**
ECTS Credits: 6

**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.

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**PS6111 - BIOLOGICAL PSYCHOLOGY**
ECTS Credits: 6

**Psychology**

**Rationale and Purpose of the Module:** Students will learn about the role of the brain and the central nervous system in human behaviour.

**Syllabus:** 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.

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**PT4005 - SUPPLY CHAIN DESIGN**
ECTS Credits: 6

**Design and Manufacturing Technology**


PT4013 - OPERATIONS MODELLING
ECTS Credits: 6

Design and Manufacturing Technology

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.

PT4007 - PLAN WITH SUPPLY CHAINS
ECTS Credits: 6

Design and Manufacturing Technology

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.

PT4011 - INTRODUCTION TO TECHNOLOGY MANAGEMENT
ECTS Credits: 6

Design and Manufacturing Technology

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.

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.

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**PT4031 - SUPPLY CHAIN MANAGEMENT STRUCTURES**  
**ECTS Credits:** 6

**Design and Manufacturing Technology**

Rationale and Purpose of the Module: This module is designed to provide a strategic understanding of the supply chain, enabling students to appreciate the supply chain phenomenon. This module:

- Defines supply chain management theoretically and practically.
- Identifies supply chain management’s role in enhancing customer fulfilment.
- Emphasises systems thinking and process management as the foundation of supply chain management.
- Examines the role of environmental scanning to define the forces driving greater collaboration.
- Discusses the critical issues involved in supply chain design.
- Discusses the vital bridges to supply chain integration and collaboration.

Design and Manufacturing Technology

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.


PT4057 - ADVANCED MODELS AND FRAMEWORKS FOR SUPPLY CHAIN MANAGEMENT
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To introduce students to a range of frameworks to inform systematic thinking on the alignment, design, implementation and operation supply chains to promote their agility, adaptability and growth. To support the lean pursuit of key strategic performance dimensions delivery, quality, and economy in the context of a dynamic, uncertain and competitive operating environment. To consider frameworks appropriate at micro, meso and macro levels of operation. To promote a quantitative approach to supply chain operations analysis. To include a strong human context in addressing diagnosis and design questions.


Sourcing Sub-contracting of production and logistics, outsourcing, off-shoring, in-sourcing, globalisation.

Product control New product and service development activities (eg Urban-Hauser; Stage-Gate, spiral models), product life-cycle., underpinning concepts such as continuous/radical/ disruptive innovation, customer experience, sustainability. Analysis tools eg customer-choice analysis, quality function deployment. Product validation.

Quantity control micro: process mapping, inventory, job sequencing, push/pull order release, model of human scheduling, queuing, littles law, flow factor. meso: forecasting, aggregate planning, routing and network planning, production-inventory system dynamics. Macro: capacity decisions, location.

Quality control micro: controllable/uncontrollable variation, sampling for variables and attributes, control charts. Meso: specification capture (QFD), fitness for purpose, reliability and risk analysis, fitness for society. Macro: strategy deployment (Hoshin), quality frameworks ISO, Baldrige, EFQM.

Production economy Cost of doing: cost estimation, asset investment cost, capital recovery, activity based costing, unit costing, rate of return on investment, intangibles. Cost of not doing: Feigenbaum quality cost model.


Human factors


Process Improvement Continuous improvement philosophy, commonalities of Lean and 6-Sigma, PDCA, forms of waste, problem seeking, focusing tools, design of experiments, engagement with people, implementation and control, kaizen, DMAIC framework. Capturing the soft side: Qualitative analysis and mixed methods. Project planning and control, specific project methodologies eg PERA. SCOR implementation framework (SCE).

Semester project work Reflection on SCOR model and its relation with the framework above. Application in depth of a focused set drawing on the frameworks listed above to solving or analysing specific supply-chain questions in a substantial semester project. The work is to be collaborative, and carried out in project teams using computer mediated communications. The results are to be presented in written and verbal form. Qualitative enquiry should inform the project development path, but the work should be primarily related to quality- and quantity-control processes.

PT4111 - MANUFACTURING TECHNOLOGY 1
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To provide the student with a basic knowledge and experience the properties of engineering materials are how they are processed and fabricated. To emphasise the importance of safety in the engineering environment. To provide the student with the knowledge to select an appropriate material for the manufacture of an engineering component or structure.

Fracture and toughness.
Factors influencing the selection and processing of materials.
Measuring instruments.
Basic machining Cutting tool geometry and materials.
Chip formation. Hand processing and surface treatment of materials.
Metal Forming - Cold, warm and hot metal forming techniques.

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PT4121 - COMMUNICATION GRAPHICS
ECTS Credits: 6

Design and Manufacturing Technology

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.


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PT4213 - DRAWING AND CAD
ECTS Credits: 6

Design and Manufacturing Technology

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.


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PT4315 - PRODUCTIVITY METHODS 3
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: part of production activity planning stream - focusing on integration and organisation of work (‘point’ work has been dealt with in a prior work design module), covering three main domains: production control at its lowest level - the scheduling/discharging domain; its integration through the layout domain; and its implementation through the project planning and control domain. There is an overall emphasis on performance, generating alternative innovative solutions, evaluating them and selecting the more appropriate.

Syllabus: part one: lectures, tutorials

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PT4317 - PRODUCTIVITY METHODS 4
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: to develop students formal planning capability in optimisation domain within context of production planning and resource utilisation and performance

Syllabus: LP is vehicle for optimisation (Taha), proceeding to stochastic simulation (Simu8 demo) and heuristic based line balancing, and dual-objective stochastic tradeoffs demonstrated by simple variability-utilisation-time queuing models (Hopp and Spearman). Mathematical level appropriate to BSc. Breadth appropriate to underpin scientific process improvement practice.

Prerequisites: PT4317

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PT4423 - 2D CAD
ECTS Credits: 6

Design and Manufacturing Technology

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; tolerated 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, multiline; using DesignCenter; DWF drawings; Introduction to 3D geometry.

Prerequisites: PT4121

PT4427 - DESIGN FOR MANUFACTURE
ECTS Credits: 6

Design and Manufacturing Technology

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.


-Copyright, trademarks and design registration.

PT4617 - RELIABILITY TECHNOLOGY
ECTS Credits: 6

Design and Manufacturing Technology

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.


PY4011 - PHYSICAL EDUCATION CURRICULUM AND ASSESSMENT
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The purpose of this module is for you to become familiar with curriculum and assessment and, in particular, within the (Irish) physical education context, informing what you believe is worth learning and worth assessing within physical education.

Syllabus: This module provides you with an opportunity to understand curriculum concepts and investigate the extent to which personal orientations and philosophies impact on curriculum. Along with your understanding of the physical education curriculum within the Irish school system, and what you believe is worth learning, you will be directed towards pursuing the use of particular curriculum/instruction models within your own teaching. Understanding assessment and its relationship to learning goals and learning experiences will allow you to determine what is worth assessing and how this can be done in a meaningful, relevant and effective way.

PY4038 - QUALITATIVE BIOMECHANICS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale:
While a sound knowledge of anatomical structure is a prerequisite 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 analysing joint function 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 mechanics in sport. 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. This module builds directly on the material of SS4302, the basic physiology module.

**Syllabus: SYLLABUS**


Prerequisites: PY4022

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**PY4055 - SOCIOLOGICAL CONCEPTS OF TEACHING AND LEARNING IN PHYSICAL EDUCATION**

ECTS Credits: 3

**Physical Education & Sport Sciences**

Rationale and Purpose of the Module: This module introduces socialisation into and through physical education and the role of the physical educator. Students are encouraged to reflect on their own socialisation into the role of physical education student and how this impacts on their understanding of physical education. This module also focuses on issues of social development (e.g. gender, social class, disability and racism). These topics are examined in light of the extent to which they have affected and are currently affecting the teaching of school physical education.

Syllabus: Topic include: socialisation, roles, interaction, identity and sociology of the body. Issues of social development are included such as: gender, race & ethnicity, religion, sexuality, family support, socio-economic status, and social power. Also included is an introduction to the sociology of sport, with an emphasis on violence in sport and the implications on teaching school physical education.

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**PY4065 - INTEGRATED AND INCLUSIVE PHYSICAL EDUCATION**

ECTS Credits: 6

**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.


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**PY4071 - PEDAGOGY OF OUTDOOR AND ADVENTURE EDUCATION**

ECTS Credits: 6

**Physical Education & Sport Sciences**

Rationale and Purpose of the Module: National documents (Teaching Council 2011) call for preservice teachers to, among other things: &bull; have knowledge of current national curricula/syllabi in the relevant sector and an awareness of curriculum requirements in preceding and subsequent stages of learning, &bull; understand the subject matter, pedagogical content and related methodology of the relevant curricula/syllabi and guidelines, and &bull; be able to think critically, analyse and solve problems, as an individual and a member of a team.

The concepts and skills associated with outdoor and adventure uniquely address each of these skill sets. As such, this module is designed to prepare preservice teachers to organise, teach, and facilitate outdoor and adventure education in Irish physical education.

Specific purposes are to:
1) enhance students’ capabilities teaching outdoor and adventure to post primary students;
2) draw links between the current national curricula/syllabi regarding outdoor education and selected curricular and instructional models; 3) recognize the potential of non-sport related activity in the lives of post primary students; and 4) gain understanding of the conduct of off-site teaching.

Syllabus: Through the acquisition of adventure and outdoor skills and knowledges, the pedagogy in teaching outdoor and adventure education and selected curricular models will be examined. Adventure principles include full value contract, experiential learning cycle, challenge by choice, briefing, processing and facilitating an experience, the determination of physical and emotional risk, and safety. Outdoor activities may include: orienteering, hill walking, camp craft, exploring nature, leave no trace, canoeing, rock climbing. Pedagogical skills involve big picture goals and assessment, aligned learning outcomes, content progression, and assessment; focused reflection on student learning linked to teacher action.

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**PY4073 - PEDAGOGY OF DANCE / GYMNASTICS 1**

ECTS Credits: 3

**Physical Education & Sport Sciences**
Rationale and Purpose of the Module: The purpose of this module is to prepare undergraduate PE students to teach the fundamentals of Dance and Gymnastics in a post-primary context; to provide safe, inclusive and educationally meaningful experiences for post-primary students in the Gymnastics and Dance. The module is designed to give students the opportunity to develop the aesthetic strands at their own level and for use in the Junior Cycle. Students will be assisted in acquiring knowledge, skills and understanding of how to create structure and form movement ideas in dance and gymnastics and to deliver lessons that are inclusive, well managed, well delivered in a safe and caring environment. Concern for safety and feedback will be actively fostered.

PY4081 - PEDAGOGY OF INVASION GAMES
ECTS Credits: 6
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 invasion games, ones in which skills and tactics can easily be identified and practiced, and where minimal equipment is required. The purpose of the module is twofold: 1.) for students to be able to understand the tactical approaches, appropriate skills, and safety considerations necessary when engaging in invasion games and 2.) to provide students with the pedagogy skills needed to teach invasion games within a post-primary setting. The module will be taught through particular curriculum model, for example TGFU. The students will live the curriculum model in order to understand the structure of the model and how it can be taught within a post primary setting.

The module will focus on principles of play and tactics within invasion games. Therefore links will be made across all invasion games so students can see the correlation and common tactics involved in each.

Syllabus: The purpose of this module is for students to become familiar with simple invasion games and, in particular, how these games are presented in the Junior Cycle, Junior Cycle short course, Senior Cycle, and Leaving Certificate physical education curricula. Students will experience and analyse many invasion games, for example Gaelic Football, Hurling, Soccer, Hockey, Rugby and Basketball, focusing on the following areas: common principles of play, tactical awareness, rules and skill acquisition; how to introduce activities and progressions; and safety considerations specific to all the games. The module will be taught through a curriculum model, for example: TGFU. TGFU will aid the principles of play and tactical focus of the module.

PY4083 - PEDAGOGY OF STRIKING AND FIELDING / ATHLETICS
ECTS Credits: 3
Physical Education & Sport Sciences

Rationale and Purpose of the Module: The aim of this course is to help students develop a practical knowledge, inclusive of theoretical aspects of Athletics. It will introduce the students to track & field athletics through participation in 'athletics related activities' and later on through participation in Olympic events. A variety of teaching methods and equipment will be used. Students will learn how to plan athletics lessons in order for them to be safe, challenging and appropriate for all abilities.

Syllabus: Theory:
Overview of athletics from a variety of perspectives (bio-mechanical, physiological, educational)
Athletics in schools - limitations and possibilities
Athletics lessons - planning for mixed ability
Logistics of running a school athletics event

Practical:
Fundamentals of running, jumping and throwing progressing to basic, event specific technique in traditional track & field athletics events (e.g. sprints, hurdles, Long Jump, High Jump, Shot, Discus etc.)
Involvement in and creation of 'athletics related activities' (indoors & out)
Teaching second level students the fundamentals of running, jumping and throwing.

PY4125 - PHYSICAL ACTIVITY, HEALTH, GROWTH AND DEVELOPMENT

ECTS Credits: 6
Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module introduces students to research methods in languages, literature and cultural studies, covering the main areas of these disciplines, their methods of inquiry, and their key concepts and problems. The module provides training in essential research skills, equipping participants to pursue self-directed study, to individually select a research topic and develop appropriate research questions, to identify the appropriate tools and methods of research to carry out this project, and write a research proposal. The aims of the module are:
- To introduce students to research methods in languages, literature and cultural studies;
- To equip students with the necessary skills to select a research topic, develop a research question(s) and write a research proposal;
- To introduce students to the research skills necessary for sourcing, storing and presenting research data;
- To develop an awareness of the information technology skills necessary to develop the above research skills.

Syllabus: Intended as an introductory course for students undertaking research in languages, literature and cultural studies, students will be introduced to the quantitative and qualitative methods employed in each of these disciplines. Incorporating a practice-based element, students will be equipped with the necessary skills to select a research topic, develop a research question, identify the appropriate methods to carry out this research project, and write a research proposal. Students will also be introduced to the skills needed to source and present language, literary and cultural data, in particular the information technology skills necessary for analysing online data such as collections of literary texts and linguistic corpora.
Rationale and Purpose of the Module: The aim of this module is to provide the students with an understanding of psychological concepts and explore how these concepts relate to health within nursing and midwifery practice.

Syllabus: Overview of emotional, cognitive, and social development. Development of intelligence. Psychology of health beliefs, experience, and behaviour. Social psychology: in particular, the concepts of attitude development, interpersonal and group relationships, and communication. Introduction to the main categories of abnormal behaviour, including their aetiology and treatment.

SO4001 - INTRODUCTION TO SOCIOLOGY
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: This module aims to introduce students to the subject matter of contemporary sociology. It will familiarise 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.


SO4037 - QUALITATIVE METHODS FOR SOCIological RESEARCH
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: The aim of the module is to provide students with an understanding 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.
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
Theorising 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

**Rationale and Purpose of the Module**: The aim of this module is primarily to provide a general introduction to the range of quantitative and qualitative research methods which are used in sociological research. Secondly, the course introduces students to the underlying epistemological, conceptual and ethical dimensions of the research process. In addition, the course establishes the importance of understanding social research in the context of some key debates in contemporary sociology. The primary objective is to provide students with basic skills in the use of both quantitative and qualitative techniques of research, and experience in collecting, handling, organising and analysing data of their choice.

**Syllabus**: This module enables students to gain an understanding of the principles of social research and related philosophical debates from a generic social science perspective. The module addresses the ethical and legal dimensions of, and power relationships within, the research process. 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, including issues of sampling, sampling error, objectivity, values and validity. They are introduced to basic statistics, SPSS, and Qualitative Techniques in Context and thus provided with a foundation for future advanced methods modules. This module covers: conceptualisation and operationalisation in research design; an introduction to qualitative techniques; analysing qualitative data; surveys and sampling; descriptive statistics and inferential statistics (SPSS); political and ethical issues in social research; presenting and dissemination research; experimental and documentary methods in social research.

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**SO4067 - SOCIOLOGY OF WORK**
ECTS Credits: 6

**Sociology**

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 an examination of globalization and the rise of the transnational corporation. The continuance of hierarchical and vertical segregation in the midst of organisational, societal and cultural change will be explored, as well as organisational culture. A number of 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.

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**SO4073 - CLASSIC SOCIOLOGICAL THEORY**
ECTS Credits: 6

**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 (industrialisation, urbanisation, 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 labour; social solidarity; class conflict and ideology; rationalisation; 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 organisation) 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.

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**SO5051 - RESEARCHING SOCIAL EXCLUSION**
ECTS Credits: 9

**Sociology**

**Rationale and Purpose of the Module**: The concept of exclusion forms the central focus around which this module is organised, it offers the possibility of considering how finely tuned are the mechanisms...
whereby we are integrated or cut off from full involvement in the wider society.

**Syllabus:** The course critically interrogates the concept of social exclusion examining its economic, social, cultural, political and ideological underpinnings. It focuses in particular on the process of aethereing/E as a practice of domination and the subtle ways in which privilege is reproduced. Through the course students will be enabled to untangle the notion of exclusion, its dynamics, processes involved, the implications of exclusion and the structural, cultural and ideological issues underlying this phenomenon and its reproduction. Through Bourdieu/Es conceptual arsenal students will be facilitated to consider the hierarchial ordering of the process of exclusion and the multi-faceted and interlinked nature of domination, privilege and exclusion.

SO6021 - THEORETICAL APPROACHES TO GENDER, CULTURE AND SOCIETY 1  
ECTS Credits: 9

**Sociology**

**Rationale and Purpose of the Module:**

1. To provide an overview of feminist and queer theoretical debates, including feminist theory, masculinity studies, queer and transgender theory.
2. To assess critically different theoretical positions in gender and sexuality theory.
3. To apply feminist and queer theoretical concepts and arguments to particular substantive topics such as family and work.
4. To examine how gender interacts with other identity markers like age, ethnicity, race, class, ability, sexuality.
5. To identify how notions like identity, self, nation are gendered and culturally constructed.
6. To examine changing cultural representations of feminism, gender and sexuality.

**Syllabus:** This course will review and critically examine the main theoretical approaches to gender, sexuality and the position of women and men in society, starting in the late eighteenth century, but concentrating on the period from the 1970s onwards. The module will analyse theories about the social and cultural construction of gendered identities, their origin, maintenance and representation. It will pay attention to intersectionality, the connection between gender and other identity markers like age, ethnicity, race, ability, sexuality, class etc. Of central importance is the practical application of different theoretical positions to specific topics like gender and employment, gender and childhood, gender and the body, gender and nationalism, gender and the media, gender and the family.

SO6031 - FEMINIST APPROACHES TO RESEARCH  
ECTS Credits: 3

**Sociology**

**Rationale and Purpose of the Module:**

1. To examine how knowledge is constructed and deployed and supplement core module on methodology.
2. To identify how interdisciplinary feminist perspectives inform research methods.
3. To examine how feminist analysis redefines traditional categories and disciplinary concepts through attention to gender and other social categories such as race, class, culture, sexual orientation, and age.
4. To find, formulate, limit, and state a research question from a feminist perspective; select/combine appropriate feminist research methodologies informed by the course readings and discussion.

**Syllabus:** This 3 credit module on feminist research methodology will supplement the 9 credit disciplinary research module undertaken by students. It will enable students to bring feminist critiques of knowledge and methodology to their research and writing up the dissertation. Students will address questions such as:

- What have feminist theorists to say about objectivity and truth/ the distinction between knower and known/ self and other/ mind and body/ subject and object? How might we understand culture and society differently if we incorporate reproduction, bodily work, and intimate relations in our research? What might be the limits of feminist standpoint, the idea that women, as a subordinated group, are in a better position to arrive at an adequate representation of social reality than men?
- What kinds of questions guide feminist research? How do feminist researchers approach the objects of their research? What is the relationship between the object of research and the feminist researcher?

SS4128 - APPLIED SPORT PSYCHOLOGY  
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The emphasis in this course 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.

**Syllabus:** Content relating to performance enhancement includes 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. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

SS4145 - PERCEPTION AND COGNITION IN ACTION  
ECTS Credits: 6

**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 change. The scientific method; observation, formulation & testing of laws & principles, Hick's Law, Fitts/E Law; theories to explain observations, principles & laws; Adams/E closed loop theory, Schmidt/E'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.
SS4202 - INTRODUCTION TO MAJOR PHYSIOLOGICAL SYSTEMS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: A thorough understanding of how the body functions underpins all subject areas in the study of sport, exercise sciences and physiotherapy. Physiology (from Greek Physio meaning nature and -logy meaning the study of) deals with the coordinated activities of cells, tissues, organs and systems. In this module students are introduced to the basic structures and functions of human physiological systems and the integration of these systems to maintain homeostasis.

Syllabus: NA

SS4203 - PHYSIOLOGY OF MUSCLE IN MOVEMENT
ECTS Credits: 6

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.


Prerequisites: SS4202

SS4205 - NUTRITION, EXERCISE METABOLISM AND SPORTS PERFORMANCE
ECTS Credits: 6

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.


Prerequisites: BC4002

SS4217 - EXERCISE AND HEALTH
ECTS Credits: 6

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, endocrine, immune and digestive systems.

SS4231 - HUMAN PHYSIOLOGICAL SYSTEM FOR SPORT AND EXERCISE SCIENCES
ECTS Credits: 3

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, endocrine, immune and digestive systems.

SS4305 - QUANTITATIVE BIOMECHANICAL ANALYSIS
ECTS Credits: 6

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


SS4308 - ADVANCED BIOMECHANICS ANALYSIS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: AIMS:
* To consolidate students’ understanding of kinematics analysis by more advanced biomechanical analysis skills in 2D and 3D analysis of motion
* Apply 3D analysis techniques to selected sporting and exercise activities

Syllabus: SYLLABUS:
[ Kinematic Conventions - Absolute spatial reference system, Total description of segments in 3D space. Advanced smoothing techniques: use of cubic and quintic splines and FFT. Advanced use of link segment equations and free body diagrams. Calculation of joint forces and moments of force. Interpretation of moment of force curves. ]
Mechanical work, energy and power: Internal versus external work, Energy transfer between body segments, Energy exchanges within segments. Review of forward solution models. Effects of orthotics on gait. Examination of footwear and sports equipment design.

SS4309 - QUALITATIVE BIOMECHANICAL ANALYSIS
ECTS Credits: 6

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

Syllabus: Skeletal system, Articular system, Muscular system, Neuromuscular system: CNS, PNS, axons, propagation, synapses, proprioceptors, exercise effects.

SS4321 - FUNCTIONAL ANATOMY
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: &bull; 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. &bull; To consolidate students' understanding human biology by more advanced functional anatomy. &bull; Apply an understanding of human anatomy to the measurement and assessment of movement.

Syllabus: Skeletal system, Articular system, Muscular system, Neuromuscular system: CNS, PNS, axons, propagation, synapses, proprioceptors, exercise effects.

SS4403 - COACHING SCIENCE AND PERFORMANCE
ECTS Credits: 6

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.


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

SS4411 - COACHING SCIENCE AND PERFORMANCE
ECTS Credits: 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.

**SS4417 - HUMAN PERFORMANCE EVALUATION**

**ECTS Credits:** 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** To gain insights into how human performance objectives in sport and health are achieved by integrating as appropriate knowledge and techniques associated with the disciplines of physiology, biomechanics, psychology 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 module that aims to complement research skills gained in the sport and exercise science final year project with practical skills and experience in sport and exercise evaluation. The course will consist of lectures on the theory and practice of performance evaluation in an integrative format to make the students critically aware of appropriate testing for different populations and the On an individual basis students will prepare a comprehensive piece of written work on effective evaluation processes pertaining to human performance and functioning in the context of sport and health. In a team-based exercise, students will make a seminar presentation on an effective evaluation process for a specific scenario in the sport and health domain.

**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 and Physiotherapy. 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.

The module introduces the student to the anatomical structures involved in human movement, as well as providing an understanding of their mechanics in the production of functional and sporting activities. Students will apply an understanding of human anatomy to the measurement and assessment of movement.

The module also introduces students to exercise prescription as well as measurement of different fitness components in the field.


**SS6002 - APPLIED SPORT PSYCHOLOGY**

**ECTS Credits:** 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The emphasis in this course 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.

**Syllabus:** Content relating to performance enhancement includes 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. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

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**SS6011 - ANALYSIS OF MOTOR SKILL PERFORMANCE AND LEARNING**

**ECTS Credits:** 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** To give knowledge and understanding of how movement skills are controlled during performance and also how they are best practised and learned. Course content will be based on research findings and theories which will be critically reviewed. There will be a strong applied dimension with the purpose of providing students with a theoretical basis for making informed decisions regarding the structuring of practice for motor skills. The module would be of interest to those from a variety of disciplines and areas involving motor skill performance and learning e.g. sport, dance, rehabilitation, industry, ergonomics.


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**SS4541 - SPORT AND EXERCISE SCIENCES - TRANSITION**

**ECTS Credits:** 9

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** The emphasis in this course 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.

**Syllabus:** Content relating to performance enhancement includes 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. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

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**TE4011 - ENGLISH AS A FOREIGN LANGUAGE 1 (INTERMEDIATE)**

**ECTS Credits:** 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide language support to students on the Erasmus exchange programmes 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: Students work from a set text book, 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.

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TE4031 - ENGLISH AS A FOREIGN LANGUAGE 1 (ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide language support to students on the Erasmus exchange programmes 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: Students work from a set text book, back-up audio visual and on-line material.
Integrated tuition and practice is 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 infinitives

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TW4115 - Principles of Professional and Technical Communication and Information Design
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: 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.

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TW4003 - INTRODUCTION TO TECHNICAL COMMUNICATION
ECTS Credits: 6

School of Culture 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.

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.

Document genres: writing manuals; designing and
TX4007 - TAXATION FOR CORPORATES
ECTS Credits: 6

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.

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 taxation. It aims to give students a thorough understanding of the manner in which individuals and unincorporated businesses are taxed in the State. The module reviews the taxation implications of business decisions and introduces the basics of tax planning.

Syllabus: Introduction to the theory of taxation and basic tax policy; overview of Irish income tax system; the self-assessment system; personal tax computations; Schedule E employment income, benefits in kind and termination payments; interest income, rental income, foreign income, dividend income; the taxation treatment of married couples; the measurement of taxable business profits, allowable and disallowable expenditures, commencement and cessation of trading; capital allowances, balancing allowances and charges; the effects of residence and domicile of individuals on tax liability; basics of tax planning; the annual budget.

TX4305 - TAXATION THEORY AND PRACTICE
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 taxation. It aims to give students a thorough understanding of the manner in which individuals and unincorporated businesses are taxed in the State. The module reviews the taxation implications of business decisions and introduces the basics of tax planning.

Syllabus: Introduction to the theory of taxation and basic tax policy; overview of Irish income tax system; the self-assessment system; personal tax computations; Schedule E employment income, benefits in kind and termination payments; interest income, rental income, foreign income, dividend income; the taxation treatment of married couples; the measurement of taxable business profits, allowable and disallowable expenditures, commencement and cessation of trading; capital allowances, balancing allowances and charges; the effects of residence and domicile of individuals on tax liability; basics of tax planning; the annual budget.

WT4003 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 2
ECTS Credits: 6

Civil Engineering and Materials Science

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 culsins, tunnelling and culverts; Underpinning, piled foundations; Demolition and temporary works, Portal frames; Introduction to high-rise construction, Introduction to fire protection; Claddings to framed structures; Formwork systems; Pre-stressed concrete; Industrial buildings.

Prerequisites: WT4502, WT4401

WT4017 - ENERGY EFFICIENT BUILDINGS
ECTS Credits: 6

Civil Engineering and Materials Science

Background: Energy supply and demand, climate change, energy performance of buildings directive and Irish legislation, technical guidance documents Part-L. Energy: Supply and demand considerations for domestic buildings (new and existing) Concepts of Temperature and Heat Energy: Concepts of conduction, convection and radiation; thermal bridging; heat energy and energy losses of materials; U-value; heat loss and heat gain; energy performance; thermodynamics and heat; energy balance; air flow and energy transfer.

Electrical and Lighting Energy assessment: Principles of measurement from plans, surveys and drawings; electrical measurements; electrical devices and efficiency. Energy Efficiency, Energy Storage and Control: Fundamental principles; principles of energy storage; heat capacity; thermal mass; heat and water; temperature measurements and control; energy sources; energy conversions; fuel, combustion and CO2 emissions; greenhouse gases; carbon dioxide emission rating; solar energy; thermal mass; solar gains; solar collectors; efficiency adjustment factors; primary and secondary heating systems; single and immersion heaters; carbon dioxide emission rating. Building Energy Ratings in domestic buildings; Use of Dwelling Energy Assessment Procedures (DEAP) software for new and DEAP+ for existing buildings; generation of advisory reports. Introduction to BER in non-domestic buildings; Introduction to SBEM for new and DEAP+ for existing non-domestic buildings. PassivHaus Standard. Exemplar Buildings.

WT4105 - WOOD SCIENCE 3
ECTS Credits: 6
Civil Engineering and Materials Science

Mechanical properties of wood
[- specific gravity, density, concept of cellular solids]
- elasticity, anisotropy, plasticity, creep, mechanosorption
[- tensile strength,] modes of failure, fracture toughness
[- compressive strength,] crushing, kinking, bending
[- hardness and abrasion resistance].

Introduction to stochastic design methods and characteristic strengths

Prerequisites: WT4104

WT4117 - STRUCTURAL DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

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

WT4203 - FURNITURE DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To give the student an appreciation of product design development and progress in a historical context, and an understanding of the underlying principles which influence contemporary furniture design.

Syllabus: Design and problem solving skills
Timbers/materials predominantly used in furniture manufacture
Mechanics of design/forces in relation to furniture design
The golden ratio and the importance of proportion
Graphical communication skills
Manufacturing process/techniques
Classical orders of architecture
Mechanics of design/forces in relation to furniture design
Memphis case studies

Prerequisites: WT4304

WT4401 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 1
ECTS Credits: 6

Civil Engineering and Materials Science

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.

* force systems

Prerequisites: WT4305

WT4405 - WOOD TECHNOLOGY 2
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To introduce the student to wood protection and finishing technology in respect of wood and wood based materials.

Syllabus: Analysis of factors governing the weathering of wood based materials - chemical, colour and physical changes. Preservatives - analysis of factors governing their selection and application. Surface finishing - analysis of factors governing selection and application of the finishing agent.

WT4503 - STRUCTURAL MECHANICS
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To develop the student's understanding of:

* force systems

Introduction to stochastic design methods and

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.
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.

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: SI units and manipulation of formulae, sources and types structural loading, reactions and supports, free body diagrams, shear force and bending moment calculations, static determinacy and indeterminacy, 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.

WT4507 - FORENSIC ENGINEERING AND ETHICS
ECTS Credits: 6

Civil Engineering and Materials Science

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 students' 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, Feld/Es 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.

Prerequisites: WT4804

WT4705 - BUILDING PRODUCTION
ECTS Credits: 6

Design and Manufacturing Technology

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.

WT4707 - CONSTRUCTION TECHNOLOGY AND MANAGEMENT 3
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: The aim of this module is to provide an understanding of overall project management process and principles and how they apply to construction projects.


Prerequisites: WT4401, WT4502, WT4003