## 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.
- **05** is just the department's 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

### Faculty Key

- **Bus** Kemmy Business School
- **SEN** Faculty of Science & Engineering
- **AHS** Arts, Faculty of Humanities & Social Sciences
- **EHS** Faculty of Education & Health Sciences
- **HUM** Irish World Academy of Music & Dance

## 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.
AC4002 - MANAGERIAL ACCOUNTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The aim of the module is to introduce students to the basic techniques, language and principles of management accounting. The module provides students with an insight into the role of management accounting as a provider of information supporting the financial decision making process of an organisation.

Syllabus: The syllabus covers fundamental issues including basic cost terms, concepts, and definitions before introducing costing systems such as full costing and Activity Based Costing. In addition to preparing basic budgets, the difficulties that are inherent within any budgeting system are presented. Students learn to analyse and explain the major causes of differences between budget and actual performance, including basic standard costs and variances. The relationship between accounting information and managers decisions in a competitive environment is demonstrated. Students learn to conduct a financial analysis to support a range of business decisions such as pricing, make v buy, limiting factor of production, discontinuation of product line, customer or market etc. Strategic management accounting is introduced. Techniques such as target costing, value chain analysis and total life-cycle costing are discussed in addition to tools for measuring performance such as the balanced scorecard.

AC4004 - ACCOUNTING FOR AUDITING AND FRAMEWORKS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The purpose of this module is to present the regulatory, legislative and governance requirements for financial reporting. The assertions contained in the resulting financial statements are challenged by the student availing of the principles of auditing to determine the adequacy of accompanying disclosures. In this way, the student comprehends the audit process led by a accounting professional as underpinning the credibility of the financial reporting process. As business transactions, be it local or global, rely hugely on this credibility, the role of the accountant as a responsible and ethical professional is emphasised.

Syllabus: Knowledge is imparted through lectures and tutorials and the completion of a case study requiring an analysis of the annual report of an assigned publicly traded company. The first series of lectures covers accounting regulation and its conceptual underpinning of accrual basis, going concern and accounting policies relating to revenue recognition and fair value. This is followed by lectures covering auditing principles and concepts, the internal control system (ICS) and auditing procedures that examine the ICS and finally the auditor’s opinion. A third series of lectures introduces corporate governance, its key functions of accountability, responsibility and transparency and the governance mechanisms that deliver corporate transparency. Study of the audit-performance expectations gap with an emphasis on professional and ethical responsibilities of the auditor completes the module.

Prerequisites: AC4001, AC4002

AC4018 - CORPORATE TRANSPARENCY AND BUSINESS ETHICS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: 1. Understand the control mechanisms of governance and financial transparency that infer the credibility of financial reporting.
3. Explore the elements of a professional judgement as an approach to making ethical decisions in business.
4. Understand that corporate compliance is fundamental to corporate social responsibility.


AC40024 - FINANCIAL ACCOUNTING AND REPORTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The aim of this module is to develop a student understanding of the theoretical framework of accounting. It introduces the student to the translation of accounting theory, concepts and principles into accounting regulation and practice. It encourages the student to evaluate selected international accounting standards.

Syllabus: The module will consider the theory and practice of selected international accounting standards and issues. Focus will be on the preparation and reporting to external users of financial information, especially, but not exclusively, equity investors. The 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.

AC4034 - AUDITING AND ACCOUNTING FRAMEWORKS
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The purpose of this module is to present the regulatory, legislative and governance requirements for financial reporting. The assertions contained in the resulting financial statements are challenged by the student availing of the principles of auditing to determine the adequacy of accompanying disclosures. In this way, the student comprehends the
audit process led by a accounting professional as underpinning the credibility of the financial reporting process. As business transactions, be it local or global, rely hugely on this credibility, the role of the accountant as a responsible and ethical professional is emphasised.

Syllabus: Knowledge is imparted through lectures and tutorials and the completion of a case study requiring an analysis of the annual report of an assigned publicly traded company. The first series of lectures covers accounting regulation and its conceptual underpinning of accrual basis, going concern and accounting policies relating to revenue recognition and fair value. This is followed by lectures covering auditing principles and concepts, the internal control system (ICS) and auditing procedures that examine the ICS and finally the auditor’s opinion. A third series of lectures introduces corporate governance, its key functions of accountability, responsibility and transparency and the governance mechanisms that deliver corporate transparency. Study of the audit-performance expectations gap with an emphasis on professional and ethical reponsibilities of the auditor completes the module.

Prerequisites: AC4001, AC4002

AC4214 - ACCOUNTING FOR FINANCIAL DECISION MAKING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: This module introduces non-business students to the fundamental concepts and practices of management accounting and finance. It provides students with the skills and knowledge necessary to identify the relevant financial information required to manage the financial and operating resources of a business.

Syllabus: This module is structured to provide non-business students with a basic understanding of both management accounting and finance. Management accounting provides information for product/service costing and profit determination in addition to information for planning, control and decision-making. Finance is concerned with the ways in which funds for a business are raised and invested. The topics covered include the relationship between financial and management accounting, costing, budgeting, short-term decision making, strategic management accounting, sources of finance, investment appraisal and management of working capital. This module is designed to be a prerequisite for the module AC4417 Management Accounting 1.

Prerequisites: AC4001, AC4002

AC4418 - MANAGEMENT ACCOUNTING 2
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: This module further enhances students 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: This module will cover inventory costing; information and the decision process; cost accumulation information for decision-making; relevant costs and revenues for decision-making; Process costing; Cost allocation and customer profitability analysis; Performance measurement; Transfer pricing and multinational considerations; Pricing; Balanced scorecard.

Prerequisites: AC4417

AR2001 - FAB LEARNING PORTFOLIO
ECTS Credits: 12

School of Design

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.

Syllabus: Design Studio is the backbone of study in Architecture. Study is organised around design aeproblems/E or projects, a number of which are given each term.

By working through the project, the student will become exposed to the architectural design process, a new and complex process for most first year students. Each project introduces a different aspect of the architectural design process in order to help the student develop a range of methods of working.
Each project also introduces a new programmatic theme so that students understand and become conversant with the many fields of operation of an architect. Themes include space and light explorations through model making, understanding the process of abstraction and transformation through model making/two dimensional work, building full scale structures in timber to explore architectural concepts such as scale, framing, section and thresholds, developing observational skills through sketching on site, learning how to make a site plan by developing a pattern of occupation on an open site, learning how to develop a building design grounded in this context.

Studio work is organised so that close contact is maintained with the student. Work is analysed and discussed with the student on an individual basis and within the group. The student is taught to recognise the design process and to value and catalogue their own work. As the year progresses the student is encouraged to become increasingly responsible for organising and developing their own work process.

The studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.

Prerequisites: AR4001

AR4004 - DESIGN STUDIO 2B
ECTS Credits: 15

School of Design

The focus of this term is housing: through analysis, research, visits, lectures, and project work students will explore the problem of housing conceptually, functionally, and spatially, as a basic human need, as a social construct, as an economic system, and as a physical thing.

* Spatial model study of housing in a specific cultural context.
* Aspects to be studied: spatial relation to land, territory, climate, privacy, social interaction, interior spatial organisation
* Means of study: intuitive and structured modelling in mix, studies in situ and sketching
* histories, characteristics, contemporary situations, investigations through site visits, lectures, mapping, free sketching, birds eye perspectives*

The architectural proposition will move through a series of studies where the student is taught to use different scales, modes of operation and reference points. The emphasis will be on the mastery of investigative skills through a range of media on an ongoing basis.

Prerequisites: AR4005

AR4008 - DESIGN STUDIO 4B
ECTS Credits: 18

School of Design

Rationale and Purpose of the Module: In order to facilitate more extensive and, at the same time, more focused design projects and adequately comprehensive thesis projects, credits awarded to Design Studio 4a and 4b increase to 18 credits while the number of parallel modules is reduced.

Syllabus: In Y4 students start a personal pursuit; they must - through their design projects and their research work - relate to the world of architecture in their own personal way. Students are expected and asked to voice their position in architecture, to find their direction through architectural design. Students will develop a method of research and allocate significant time to the research part of the curriculum. The architectural project will be tightly allied to construction and the physicality of building; construction technology will be an important part of the years work.

In the spring semester students are expected to measure their design ability against tightly drawn demands and complex programmatic issues within a sophisticated cultural and architectural framework - to create a complex architectural object. Design Studio will facilitate more inventive/experimental work, leveraging the knowledge of what students are already able to do. Design projects require an integrated technological proposition in terms of structure, construction, materials, and environment at an advanced level.

AR4012 - GRAVITY AND REACTION 2
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: Give students an understanding of a small number of useful structural concepts using experiment, intuition and formal learning.
Give students a strong conceptual and formal grasp of these concepts, that are applicable to actual conditions.

**Syllabus:** Continued Introduction to structural concepts. Topics covered will be Pin jointed frames, Parallel chord cantilever truss multiple point load. Parallel chord cantilever truss: uniformly distributed load Pitched roof truss, Internal Forces in Beams, Axial, shear bending definitions, corresponding internal stress states, simplified models of stress states. End load cantilever with uniformly distributed load, Simply Supported Beam: mid-span point load with deflection, Simply Supported Beam: 2 point loads, Simply Supported Beam: uniformly distributed load with deflection, Supported Beam: partial uniformly distributed load, 3 Pin frame with vertical point load, 3 Pin frame with horizontal point load., 3 Pin frame with uniformly distributed load, Qualitative analysis: Frames, deflected shapes, tension zones in bending, axial force, shear force. Students will Construct:

(a) A cantilever truss with 1.0kg point load and a slender braced bottom chord. 1.0m long 200mm deep (2 groups).

(b) A simply supported beam and a fixed ended beam (same section) with mid span point loads 1.0kg approx.

(c) A cantilever beam 1.0m long with a 1.0kg end point load. A cantilever beam (same section) 2.0m long with a 1.0kg end point load measure deflections (1 group).

**Prerequisites:** AR4011

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**AR4016 - GRAVITY AND REACTION 6**

ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** Give students an understanding of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.

**Syllabus:** Continued Introduction to structural concepts. Topics will be studied directly in the laboratory will be portal frames, crane structure; Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulaminated timber; steel; models to describe failure modes in structures.

Students will research:

- Materials in the studio and in a site context.
- Materials used in structural design and their relevant components
- Design and build in model form a bridge with calculated design loads and span.

**Prerequisites:** AR4013

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**AR4014 - GRAVITY AND REACTION 4**

ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** Give students an understanding of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.

**Syllabus:** Continued Introduction to structural concepts. Topics covered will be portal frames, crane structure; RC beam design; timber truss design in qualitative process; shells, membranes. Introduction to materials used in structural design; concrete, reinforced concrete; timber; laminated timber; glulaminated timber; steel; models to describe failure modes in structures.

Students will research:

- Materials in the studio and in a site context.
- Materials used in structural design and their relevant components
- Design and build in model form a bridge with calculated design loads and span.

**Prerequisites:** AR4011

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**AR4024 - REPRESENTATION / DRAWING 4**

ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** In this module students hone skills in drawing through practising, and form an understanding through application.

**Syllabus:** To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course consists of three different types of drawing exercises:

Surveying using the sketchbook, pencil and the body to observe and record buildings, proportions, scale, and distances of objects. Surveying using careful notation of dimensions through careful observation, and detailed measuring using a tape measure and triangulation.

Drawing, with pencil, the results of the survey carefully bringing all information to the same level of detail and consistency on a well organised composed drawn document.

**Prerequisites:** AR4023

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**AR4026 - REPRESENTATION / DRAWING 6**

ECTS Credits: 3
School of Design

Rationale and Purpose of the Module: In this module students develop skills in 3-dimensional modelling using the computer, in conjunction with continuing studies in physical modelling. Switching between digital and analogue modes of representation, e.g. models, drawings, digital photography, FormZ, Rhino, and SketchUP, programmes will be explored as tools of transformation and spatial, logical, and structural exploration.

Syllabus:

- Widening the pallet of modes of representation that the student must master, 3-dimensional modelling is taught as a tool of spatial investigation and representation, this course consists of three different types of drawing exercises:
  - Moving actively between analogue and digital modes of representation, students will develop their ideas between media, exploiting the most powerful aspects of each in terms of their design. Students will develop in parallel their model making skills.

Prerequisites: AR4025

AR4032 - HISTORY AND THEORY OF ARCHITECTURE 2
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: to expand students’ horizons of knowledge about architecture while teaching the foundational skills in reading and writing in the discipline. Even though students at the School of Architecture are expected to be 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 help students attain a basic literacy in the discipline while introducing contemporary ways of thinking about the field.

Syllabus: The theme for the spring workshop is Building. The second 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 urban history.

Prerequisites: AR4031

AR4034 - HISTORY AND THEORY OF ARCHITECTURE 4
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: The second year program in Architectural Research provides students with a comprehensive survey of the history of architecture and urbanism. In the second semester students will continue to hone the specific cognitive skills required to address the field, deepening their knowledge of the local and global built domain while reading, writing, and researching architecture. The second year program revolves around intensive workshops and seminars.

Syllabus: Continuing the survey from the first term, the period covered will be from 1945 to the present day, course will survey not simply the history of modern architecture, but the history of environmental, structural, and social systems in such terms. The course is composed of Lectures, seminars, writing workshops, together with research papers.

Prerequisites: AR4033

AR4036 - HISTORY AND THEORY OF ARCHITECTURE 6
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: The third year program in Architectural Research continues the comprehensive survey of the history of architecture and urbanism in the programme curriculum. This module exposes students to urban history.

Syllabus: Through lectures, discussion seminars, field trips, and writing the course will survey urban history from prehistory to the present day. The course is a broad introduction to urbanism throughout the ages, from the Paleolithic to the present day both in critical texts and first hand. Students will be exposed to the complexity of collective human inhabitations throughout the ages, both in Ireland and abroad.

Prerequisites: AR4032

AR4042 - ASSEMBLY AND TECHNIQUES 2
ECTS Credits: 3

School of Design

Rationale and Purpose of the Module: Study of building elements and their design origins. Introduction to constructional detail in drawings and models.

Syllabus: This course will consider the physical realisation of design aspirations through the detailed study of various building elements; structure roof window, entrance etc. This study will be formed by a combination of case study seminars, site visits, as well as the individual students detailed developed of some aspects of their design studio project. The students will...
be introduced to methods of describing and analysing constructional assembly through drawings and model at scales 1:10 to 1:1.

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**AR4044 - MATERIALS 1**
ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** The aim is to introduce students to the properties and uses of groups of materials, such as timber, glass, plastics, mineral materials, stone, metals, fabrics, others in architecture, to give students a physical, technological, and analytical basis from which to approach materials in architecture.

**Syllabus:** The content of the course is focused on material research, practical tests, experimentation with built works, and lectures/seminars by renowned individuals. A wide-ranging collection for students' use and inspiration will be built in the studio, working together to develop a system to show and organize this collection in the studio.

Studio exercises are construction based project work, build a skin for 1mspace out of different materials, one from each group, understanding the characteristics by touching and assembling different materials, analysing the models. There is a lecture series from external architects and artists known for dealing with one specific material, fabrics, wooden constructions.

Second block: Lectures with focus on the physical characteristics of materials, together with a review of the research results of the students so far.

Exercises: Material tests of samples in respect of light, heat, and other physical stresses.

Third block: Lectures with focus on assembling techniques of different materials

Prerequisites: AR4043

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**AR4052 - ENVIRONMENTAL SYSTEMS AND FORCES 2**
ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** Continuation of first term's work, to give students a basic understanding of physical backgrounds and interconnections for a sustainable development.

**Syllabus:** Sustainable development is a base for the future of human society on our planet. Architects as the designer for the built environment have a key position in this approach. Therefore a basic understanding of the physical backgrounds and interconnections is necessary. This lecture content spans from global to local and micro climate, to energy and its different forms and sources towards materials and their properties. Parallel and interconnected to the teaching of design basics like space, light, boundaries students will learn the physical backgrounds and properties by handling and personal experiences. Burning your finger at a hot stainless steel surface while missing the heat radiation and understand why this happened - is a much deeper experience, than just calculating heat conductivity on a piece of paper.

Prerequisites: AR4051

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**AR4054 - ENVIRONMENTAL SYSTEMS AND FORCES 4**
ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** Development of sustainable principles in design with particular emphasis placed on the house, and achieving balanced solutions in relation to energy and sustainability.

**Syllabus:** Study of all environmental systems required to create a built environment that is in-balance with nature, with particular emphasis placed on the energy and sustainability needs of housing. Students will conduct experiments, research, and learn methods to analyze, design, and text the environmental aspects of the built environment including, U-Values, building envelope integrity tests, daylight tests. Students will construct from actual data (weather data, etc.) models realistic assessments of a building's environmental performance.

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**AR4055 - CULTURE, PLACE AND ENVIRONMENT 1**
ECTS Credits: 3

**School of Design**

**Rationale and Purpose of the Module:** In most cases nowadays, one cannot simply go out and start building. Things must be planned, consents sought, materials organised. The overall architectural project will take
time, and will move through a series of modes, and a series of technological, regulatory and economic inputs. The module offers a critique of this parts-based approach, which, it seems, interferes with and determines our capacity to generate spatial, or pictorial, order through a greater understanding of visual world as operated upon by artists, with a particular focus on their means of engagement.

**Syllabus:** In the history of art and architecture, there are moments when a new order emerges. This module, through an examination of drawings, built work and work practices, traces the links between the emergence of a new order and the practice of the person who brings it into being. This module investigates in some detail the work of several practitioners through time, and as a specific example, will also examine the relationship of three practitioners, the painter Bridget Riley, the sculptor Donald Judd and the architect Kazuyo Sejima, to the progress of their work and situates this in the context of the work of Ludwig Mies van der Rohe.

**Prerequisites:** AR4032

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**AR4058 - PROFESSION AND SOCIETY**

**ECTS Credits:** 3

School of Design

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**AR4068 - ADVANCED CONSTRUCTION 2**

**ECTS Credits:** 3

School of Design

**Rationale and Purpose of the Module:** An extended and clearly structured curriculum in construction design to induce a more innovative and imaginary approach to materials and details. In order to ensure the expected high level of competency in advanced building construction (at an industrial scale and with respect to contemporary and innovative technologies) SAUL introduces a set of Advanced Construction modules throughout Y4 and Y5 in close relation to and in support of the Design Studio projects.

**Syllabus:** The series of modules in Advanced Construction expands the scope of students competencies in building technologies and construction beyond traditional methods and their related familiar scale. In the final year, students engage in a tested dialogue with concerns of design, structure, environment, history and theory, representation, digital media, and other related areas and interests. Students undertake a Technical Design Thesis, contextualised as part of a broader dialogue in which the technical and architectural agendas that arise within the year are synthesised. The constructional and technological proposition is pursued critically and developed imaginatively through case studies, material experiments, extensive research and consultation.

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**AR4310 - ADVANCED CONSTRUCTION 4**

**ECTS Credits:** 3

School of Design

**Rationale and Purpose of the Module:** To understand the role of engineers in society and the different types of engineering. To understand the basic techniques of problem solving in engineering. To understand the basis of forces and moments in analysing structures. To understand the basics of linear and angular motion when analysing dynamic problems.

**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. Using a calculator correctly, Introduction to Engineering Units, Conversion Factors, Dimensional Consistency, Significant Numbers, Newtonian Mechanics, Forces, Vectors, Resolution of Forces, Moments of Forces, Free Body Diagrams, Reaction Forces, Linear Motion, Angular Motion, Mass, Weight, Momentum, Conservation of Energy

**Prerequisites:** AS2391

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**AW4006 - PEER-TUTORING IN ACADEMIC WRITING**

**ECTS Credits:** 6

School of Culture and Communication

**Rationale and Purpose of the Module:** This module recognises the centrality of writing in higher education and the importance of writing as a means of learning. Writing fosters metacognitive thinking about writing leading to the development of transferable generic and complex-thinking skills for students in all disciplines, which in turn generates better writers in both academic and professional settings. Better writers, critical thinkers and researchers are better equipped to sustain the knowledge economy. In this context, the module responds to the University’s ongoing need to create better writers in all disciplines. Peer-tutoring is a step towards providing a coordinated and systematic approach to writing development that is sustainable and...
cost effective as it will produce a cohort of fully trained, confident graduate and postgraduate student-tutors from a wide variety of disciplines.

Syllabus: Students will develop an awareness and command of the metalanguage to discuss their own writing process. This will be developed through reflecting on existing and past writing assignments. Through small group discussion and writing-focused workshops, students will be engaged in activities to develop themselves as writers and writing tutors, including critical and reflective evaluation of their own writing; familiarity with the conventions honoured and the criteria used by other disciplines for the evaluation of writing therein; development of tutoring strategies; observations of experienced peer-tutors; engagement in regular peer-tutoring activity; managing diverse tutoring situations; and professional development. Students will read, write and talk about argumentation, arrangement of ideas, coherence, discipline-specific style conventions and values, grammar, and ethical concerns.

AW6012 - ACADEMIC LITERACIES FOR INTERNATIONAL POSTGRADUATE STUDENTS 12
ECTS Credits: 3
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is intended to replace EF6002, which provides language support at Proficiency Level for students on the MA TESOL programme whose L1 is not English. This modification requires broadening EF6002 to offer support to all international students undertaking PG programmes with the aim of enabling students to adapt better to their new learning environment, and foster the linguistic skills necessary to do so. The University’s strategic goal is to increase the number of International students coming to UL and the number of UL students who have an overseas experience as part of their degree. With an increase in international students comes a new set of challenges such as different educational structures, teaching and learning styles, as well as social and cultural differences. This module is intended to assist international students undertaking PG Programmes with the aim of enabling students to adapt better to their new learning environment, and foster the linguistic skills necessary to do so. This module aims to:

• Equip International students with the linguistic skills necessary to succeed in UL
• Equip International students with the written and oral communication skills necessary to participate effectively in the academic community
• Enable International students to become critical thinkers and researchers
• Encourage students to become autonomous/independent learners
• Enhance the learning experience of students

Syllabus: International students often face linguistic challenges and this module offers strategies for managing this experience and for providing a rich and engaging learning environment for such students. This module will focus in particular on academic writing for International students. This will include a focus on paragraph organisation (paragraph structure; development of ideas; cohesion and coherence); paraphrasing; forming and articulating arguments and discussion (discussion vocabulary; counter-arguments; the language of discussion), academic style; and academic vocabulary.

Proposed Content: (1 x 12 lecture; 1 x 12 tutorials)
Session 1: Paraphrasing and Organising Paragraphs
Session 2: Argument and Discussion
Session 3: Academic Style
Session 4: Academic Vocabulary
Session 5: Preparation for Writing an Academic Dissertation

BC4002 - INTRODUCTORY BIOCHEMISTRY
ECTS Credits: 6
Chemical Sciences

Rationale and Purpose of the Module: * To provide an understanding of the structure and function of the major biological molecules
* To provide an understanding of the principles of metabolism
* To provide an understanding of the biochemistry of blood and basic immunology

Syllabus: The structure and biological function of proteins: Amino acids, peptides and the peptide bond. Polypeptides. Overview of protein function; catalysis, transport, structural, regulatory and defence functions. Case study; structure and function of muscle proteins; myosin, actin and muscle contraction. The structure and biological functions of carbohydrates:

Monosaccharides, disaccharides, polysaccharides.

BC4008 - IMMUNO AND DNA DIAGNOSTIC TECHNIQUES
ECTS Credits: 6
Chemical Sciences

Rationale and Purpose of the Module: To provide an overview of the immune system, structure and function of antibodies and usage of Immune and DNA diagnostics.


BC4705 - INDUSTRIAL BIOCHEMISTRY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To present an overview of major practical aspects of pharmaceutical manufacture, quality systems and pertinent environmental regulation. To present an overview of industrial enzymes/proteins and their uses. To facilitate critical analysis of issues/topics pertaining to these themes and to provide scope for a measure of student self-directed learning.


Prerequisites: BC4903, BC4803

BC4718 - INDUSTRIAL BIOCHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To present an overview of (a) animal cell culture and (b) pharmaceutical biotechnology in the context of underling science and industrial/medical applications.

To present an overview of patenting as applied to biotechnology.

To provide the scope for a measure of student self-directed learning and problem-based learning.

Syllabus: Animal cell culture; Overview and introduction to animal cell culture. Animal cell culture, media, methods and apparatus. Animal cell culture; production of industrially useful products. The drug development process; Regulatory route for new drugs in USA & EU. Biopharmaceutical manufacture; Patenting and biotechnology. Principles of patentability. The patent application process. Sources of biopharmaceuticals. Upstream processing. Downstream processing. Post translational modifications and their significance. Product QC and the range and significance of potential product impurities. Nucleic acid-based biopharmaceuticals; The theory underpinning gene therapy, antisense based products and aptamers. Specific biopharmaceuticals; Students will be provided with 2-3 specific biopharmaceutical products/product families, along with bibliographic details of at least 1 reference source material for each. Students will be expected to source the references, along with any additional pertinent references and undertake self-directed study of the biochemistry and biotechnology of the representative biopharmaceuticals.

Prerequisites: BC4904, BC4905, BC4903

BC4904 - PROTEINS AND DNA
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To develop themes in protein chemistry and enzymology. To develop a fundamental understanding of enzyme kinetics, catalysis and purification. To understand the relationship between nucleic acids and proteins leading to gene structure and expression. To back these concepts up with practical skills.


Prerequisites: BC4903

EXTS Credits: 6

Center for Teaching and Learning

BR4001 - BROADENING: SOCIAL AND CIVIC ENGAGEMENT
ECTS Credits: 6

Rationale and Purpose of the Module: This is a new, innovative and unique module in how it approaches student engagement at a local, regional and national level. It challenges students to critically engage with the graduate attributes in a non-traditional manner through the development of leadership skills and investment in championing real issues through personal and social responsibility. It focuses on the personal development of the student through 'reflection in action' prioritising their personal and academic development. The module will be an elective open to students from all programmes (year 1-3) and initially the aspiration would be to pilot it as an elective in the BBS with a maximum of 50 students.

Syllabus: This module focuses on self development and the key graduate attributes through a process of self directed learning and collaborative projects in key issues of regional and national importance. Students will develop personal and academic curiosity through live projects both within UL and in the community with opportunities to demonstrate strong links with the Civic Engagement Office. Students will develop skills in leadership and critical analysis in relation to how they can impact on their community in a regional and national level.

The campaign element of the module would involve research in an area of social importance (with a focus on students) such as Road safety, mental health, sexual health, social responsibility, alcohol awareness, drug abuse, equality and many more working with the Students Union on the many issues and campaigns they take on. The campaign will have to have an online element and a visible element on campus, a public speech and talk is encouraged and as much engagement with UL and or external bodies is also envisaged.

BR4061 - BROADENING THROUGH AWARENESS, ACTIVISM AND THE ARTS (UNDERGRADUATE)
ECTS Credits: 6

Humanities
Rationale and Purpose of the Module: The purpose of this module is to provide students with a contextual understanding of the role of the arts in promoting awareness and activism, as well as the skills to devise a curated or performed work around a particular issue. This module is part of the university broadening agenda and resonates with the commitment within the UL Strategic plan to create interdisciplinary learning opportunities. The host unit for this module is the Irish World Academy of Music and Dance.

Syllabus: This module explores the role of the arts as an agent of social activism and a means of raising awareness. It will introduce a number of case studies that explore the use of music, dance, visual arts and architecture as media for addressing concerns around environmental sustainability, health and well-being, poverty and social regeneration and will devise a curated or performed work to raise awareness and public profile around an issue selected by the student group in consultation with module leaders

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BR4081 - BROADENING: ACTIVE BODY, ACTIVE MIND
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: This module is part of the Broadening the Curriculum Agenda here in UL for creating interdisciplinary modules as part of the UL Strategic plan and specifically is designed to enable students to evaluate the importance of health for optimal learning, educational achievement and personal development and appreciate the relationship between an active body and active mind. Through engaging in diverse learning strategies that include practical learning as well as the more traditional lecture and tutorial format, students will experience first-hand the interplay of physical, mental, social and emotional dimensions of learning for health. It will encourage students to integrate the important concepts of an active lifestyle for physical and mental health, well-being and academic achievement. In addition, the module aims to take students beyond traditional understandings of health and learning and to apply their new knowledge to create sustained cognitive, emotional and behavioural change for improved learning and health gains.

Syllabus: Students will be provided with content and opportunities that allow them to engage in physical activity and learning in a fun, creative, challenging and social context. Through the introduction of different physical activities using the UL campus environment (e.g., team challenges, orienteering, walking, aquatics, sports, dance) students will become aware of the common curricular of physical activity not only from a group perspective but also with respect to the level of autonomy individuals have in determining their own active lifestyles. The module provides students with an opportunity learn from an interdisciplinary and intradisciplinary perspectives how to make decisions from a collective group perspective as regards the determinants of being physically active and also accommodate space for students to identify their own motives/ motivational climate in considering and maintaining an active lifestyle. Behavioural change models (e.g., the transtheoretical model/ stages of change model) provide the framework for students to conceptualise and measure active lifestyles of the student population as well as their own. Additionally, this framework can facilitate promotion strategies for individuals and groups. Attention will also be given to the environment in which activity occurs focusing on aspects of contextual intelligence. In addition to enhancing their physical health, the module will also challenge students to become critically aware of their learning styles, their personal study habits and the link between physical activity and improved motivation and learning success.

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BR4091 - BROADENING THROUGH SUSTAINABLE DEVELOPMENT
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: This interdisciplinary module facilitates the Broadening Agenda and the University of Limerick's Strategic Plan as it seeks to introduce students to sustainable development and equip them with the knowledge, skills, values and literacy for assuming a responsible and informed position as ethically-minded citizens. By addressing the three principal strands of sustainable development - economic, environmental and social - the module will build awareness and coherency around questions of global and local connectedness and interdependency, equity and the fragility of eco-systems. Pedagogically, the module will enhance analytical and critical thinking skills by applying theory to practice and cultivate a community of learners able to develop community led solutions for a sustainable future. The module is taught by an interdisciplinary team from across all University Faculties to ensure multiple and often conflicting perspectives on Sustainable Development are presented to the students.

Syllabus: Definitions and contexts for understanding social and human aspects of sustainable development, critical thinking, challenging assumptions, examination of knowledge creation and semiotics.

Climate change, the physical science and international politics, energy, energy use in everyday living, transport, sources of energy and GHG emissions for different sources, energy dependence, renewable energy (wind, biofuel, solar, wave), efficiency and conservation, peak oil.

The economics of sustainability, does sustainable innovation enable sustainable growth? Consumption and production, environmental impact of everyday things, how marketing influences behaviours, life cycle thinking, behavioural thinking, systems change and intervention, creativity and innovation, corporate social responsibility, ethical investment and economic.

Food, sustainable food production, energetics of food production, sustainability of the food chain.

Sustainability and public policy, sustainable development in the national context, the public policy making process, horizontal policy issues, regional and local, European Community and the environment. Sustainability metrics, using scientific analysis to quantify sustainability as guidance for policy makers, environmental taxes, non-environmental subsidies.

Sustainable communities, building sustainable community action, bottom up approaches, role of local democracy and environmental and social movements, local agenda 21.

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BR4901 - BROADENING: BEGINNERS JAPANESE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: In line with the UL strategy to broaden the curriculum, this module will offer students in a range of different disciplines an opportunity to engage in learning Japanese. In our increasingly multicultural and multilingual society, it is
crucial that students have opportunities to learn about and appreciate other languages and cultures. To this end, the module aims at developing students' competence in Japanese and is targeted at those who have not studied Japanese previously. The module is mapped on to the A1 level of the Common European Framework for Languages where the emphasis is on developing confidence and a degree of accuracy when using the language in a limited range of situations.

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

Syllabus: This module aims to introduce students to French and gradually develop their ability to function in everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in French to:

- recognize numbers, times, days, dates, where things are, greetings and questions;
- speak using greetings, expressions of time, price, number, place, talk about themselves, their likes, dislikes, pastimes and schedules, and ask basic questions;
- read words written in the hiragana, katakana and kanji writing systems, grasp information from signs, posters, notices, self-introductions, and descriptions;
- write, using the writing systems studied, short passages about themselves, their lives and their pastimes; in particular, passages introducing themselves and their schedules;
- be able to read and write using hiragana, katakana and about 50 kanji;
- discuss and analyse aspects of Japanese history, culture and society in English.

BR4921 - BROADENING: BEGINNERS GERMAN
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

Syllabus: This module aims to introduce students to German and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in German to:

- manage to pronounce very short, isolated mainly ready-made expressions;
- show a limited control of a few simple grammatical structures;
- use a very basic repertoire of words related to personal details;
- use a limited range of vocabulary to talk about particular concrete situations;
- use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
- write simple isolated phrases and sentences on everyday topics.

BR4931 - BROADENING: BEGINNERS SPANISH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

Syllabus: This module aims to introduce students to Spanish and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in Spanish to:

- recognize numbers, times, days, dates, where things are, greetings and questions;
- use a limited range of vocabulary to talk about particular concrete situations;
- use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
- be able to read and write using hiragana, katakana and about 50 kanji;
- discuss and analyse aspects of Japanese history, culture and society in English.
situations. The module will stimulate students’ interest in Spain and Latin America and deepen their knowledge and understanding of Spanish and Latin American society and culture.

**Syllabus:** This module aims to introduce students to Spanish and gradually develop their ability to the level of A1 as outlined by the Common European Framework for Languages. Students should develop a basic understanding of everyday vocabulary, understand the rules of pronunciation and have a basic grasp of the relevant grammar for that level. The module will allow students gain sufficient proficiency in Spanish to:

- manage to pronounce very short, isolated mainly ready-made expressions;
- show a limited control of a few simple grammatical structures;
- use a very basic repertoire of words related to personal details;
- use a limited range of vocabulary to talk about particular concrete situations;
- use a small range of ready-made expressions and phrases related to everyday topics (introductions, leave-taking, apologies);
- write simple isolated phrases and sentences on everyday topics.

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**BY4002 - BIOLOGY 2**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to introduce students to fundamental concepts in cellular reproduction and genetics; diversity of life, introductory plant physiology, evolution and ecological principles.

**Syllabus:** Cellular reproduction; binary fission, mitosis and meiosis. Introduction to genetics; Mendelian inheritance, chromosomes and genes, mutations. DNA; structure, replication and organisation in cells. Gene activity; the genetic code, transcription, translation and expression. Plant structure and function; transport in plants, reproduction, seed structure, germination, growth and development, plant adaptations.

Introduction to taxonomy and classification. Introduction to animal kingdom (Protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Echinodermata, Arthropoda, Chordata). Introduction to fungi, algae and plants (Bryophyta Pterophyta, Coniferophyta, Anthophyta). Evolutionary theories, evidence for evolution, evolutionary process, origins of life. Principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns.

**Prerequisites:** BY4001

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**BY4008 - GENETICS AND MOLECULAR BIOLOGY**  
**ECTS Credits:** 6  
**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of this module is to give students an understanding of the mechanisms underlying genetic inheritance at organism, gene and molecular levels in the light of current knowledge. It is also designed to equip the students, most of whom will be aspiring second-year teachers of biology, the necessary skill and knowledge to able to teach genetics confidently, competently and imaginatively at second level.


**Prerequisites:** BY4002, BY4006

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**BY4008 - NEW DEVELOPMENTS IN AGRICULTURAL SCIENCE 2**  
**ECTS Credits:** 3  
**Biological Sciences**

**Rationale and Purpose of the Module:** The purpose of the module is to educate the students in animal production, health and welfare so that they are able to teach it as part of agricultural science at leaving certificate level

**Syllabus:** - Animal Welfare  
- Five freedoms of animal welfare, Animal Welfare Law; principles of animal welfare; body condition scoring of cattle, sheep and pigs; major categories of animal diseases; zoonotic and notifiable diseases.  
- Sheep Flock Management  
- oSheep production systems; sheep breeds; sheep breeding; rearing and feeding of sheep and lambs; sheep diseases; building and handling facilities for sheep.  
- Beef Herd Management  
- Breeds of beef cattle; rearing and production of steer, heifer and bull beef; feeding of beef cattle; carcass grading systems for beef cattle; diseases of beef cattle; housing and handling facilities for beef cattle.  
- Dairy Herd Management  
- Breeds of dairy cattle; spring and autumn calving dairy herds; life cycle of a dairy cow; the lactation curve; diseases of dairy cows; rearing of dairy calves; feeding of dairy cattle; milking machine and milking parlour operation; housing and handling facilities for dairy cows.  
- Pig Production  
- oBreeds of pigs; the pig production cycle; diseases of pigs; feeding of pigs.  
- Poultry Production  
- Poultry management of production of meat and eggs; poultry housing.

**Prerequisites:** BY4025

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**BY4104 - ECOLOGY 1**  
**ECTS Credits:** 6  
**Biological Sciences**

Freshwater ecosystems: lentic and lotic habitats, plant and animal life; physico chemical and other abiotic influences in freshwater ecosystems Marine ecosystems, concentrating on the ecology of rocky shores; brief
consideration of sandy, muddy and estuarine ecosystems; plant and animal life and the influence of physicochemical and other abiotic factors intrinsic to these ecosystems. General introduction to plant and vegetation ecology, plant communities in Ireland. Woodland ecosystems: structure, composition, succession. Adaptations of woodland plants and animals. Population dynamics and ecological strategies of woodland plants. Food webs, primary and secondary productivity in these ecosystems. Detritus and grazing food chains. Detritivores in woodlands; fungi and their role in woodlands. Introduction to vegetation sampling.

Prerequisites: BY4001, BY4002, BY4003

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**BY4214 - PRINCIPLES OF HUMAN NUTRITION**

ECTS Credits: 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To introduce students to the basic concepts and principles of Human Nutrition

**Syllabus:** This module will examine nutrients, their role in optimal health and prevention of disease. The absorption, digestion and essential functions of the macronutrients (carbohydrate, protein and lipids) and the micronutrients (vitamins and minerals) will be explored. Changes in nutritional requirements at different stages of the life cycle will be discussed as well as special needs during pregnancy, lactation and aging. The impact of nutrition and food on the promotion of health and the prevention of disease will be fully explored. Topics covered include: energy requirements, carbohydrates, protein, lipids, absorption, digestion and metabolism of nutrients, vitamins, minerals, water, dietary standards, heart disease, cancer, obesity, maternal nutrition/lactation, infant/childhood/teenage nutrition.

Prerequisites: BY4001, BY4002, CH4102

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**BY4505 - POLLUTION BIOLOGY**

ECTS Credits: 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To familiarise students with the main types of environmental pollutants, their origins, exposure routes and impacts. To equip students with skills in the methodology monitoring the impacts of selected pollutants.


Prerequisites: BY4003

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**CE4004 - MECHANICS OF SOLIDS**

ECTS Credits: 3

**School of Engineering**

**Rationale and Purpose of the Module:** Aims and Objectives

* To provide a foundation for analysing structures.
* To provide the foundations for analysing stress and strain.

**Syllabus:** Infinitesimal strain at a point in a two dimensional stress field and Mohr strain circle. Selection of strain gauges for measurement on metals, thin circular plates. Complex stresses and criteria for failure of isotropic homogeneous materials (Rankine, Tresca and Von Mises). Linear elastic fracture mechanics. Fatigue. Unsymmetrical bending of open and closed thin walled beams: shear centre. Constitutive relations. Temperature stress, Torsion of cylindrical sections, Analysis of stress at a point in 2D, Principal stress and Mohrs stress circle, thin cylinders and thin spherical vessels.

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**CE4008 - VLSI DIGITAL PROCESSING SYSTEMS**
**ECTS Credits: 6**

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** Introduce and use advanced algorithms and architectures for the efficient digital implementation of signal processing algorithms.

**Syllabus:** Pipelining and parallel processing. Signal flow graphs, Fine grain pipelining. Block processing. Low power architectures. Fault-tolerant DSP.


Modular arithmetic. Galois field Architectures for multiplication, division and exponentiation.


**Prerequisites:** EE4817

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**CE4013 - STRUCTURAL ANALYSIS**

**ECTS Credits: 6**

**School of Engineering**

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.

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**CE4024 - STRUCTURAL STEEL AND TIMBER DESIGN**

**ECTS Credits: 6**

**School of Engineering**

**Rationale and Purpose of the Module:** This module introduces the student to the structural design and detailing of elements in steel and timber with the following key objectives:

- To master the concepts of structural design in steel and timber.
- To develop the skill of detailing structural connections in steel and timber.
- To develop an awareness of the structural uses and limitations of steel and timber.

**Syllabus:**

- Structural Steel Manufacture and composition û a review, section properties tables, design of fully restrained, partially restrained and un-restrained beams, truss design, design of long and short columns; axial and combined loading conditions, design of pinned and moment connections, baseplate and splice design, structural detailing and fire & durability issues.
- Timber Design Properties and conversion of timber û a review, beam design, column design; axial and combined loading conditions, truss design and stability issues, Introduction to diaphragm & shearwall design, bolted, nailed and stapled connections, glulam, LVL and I-beam design, structural detailing and fire & durability issues.

**Prerequisites:** CE4002

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**CE4028 - ENERGY EFFICIENT BUILDINGS: MODELLING AND DESIGN**

**ECTS Credits: 6**

**School of Engineering**

**Rationale and Purpose of the Module:** Building energy design is now a primary driver of overall building design. Understanding building energy physics is now essential for all design team members. Aims and objectives: Train students how to design and model energy-efficient buildings; Equip students with the knowledge required to quantify the energy-efficiency of preliminary designs and propose building and material design modifications; predict thermal performance within building zones; understand how building design, occupancy and use interacts with thermal energy systems, solar irradiance and weather conditions as well as their effect on human comfort and energy consumption.

**Syllabus:** Building design and energy use: historical trends, current status and future trends Building energy policy at national and EU level; factors affecting human comfort; Steady-state and transient thermal physics of buildings; heat transfer mechanisms; performance metrics; typical metric values for building including exemplar low-energy and passive builds; design related and environmental performance drivers coverall form, aspect ratio, surface-to-volume ratio, percentage glazing, orientation, site context, solar irradiance, prevailing winds, shelter, design features including insulation, solar shading, low-e coatings, automated shading and ventilation.

Overview of strategies for modelling building thermal physics; thermal resistance networks; lumped capacitance; steady-state vs. transient; dimensionless scaling parameters and empirical correlations; compiling input data - building fabric, thermal mass, weather data, building use, active, passive and mixed mode ventilation, thermal sources, heating & cooling systems, control strategies and feedback.

Design thermal model, build and digitise model, configure inputs, configure outputs, solve and interpret outputs; describe scope and limitations of model; suggest modifications to enhance energy usage, update model, analyse response and appreciate cost benefit of road design: Road construction details and geometric guidelines, road junction analysis.

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improvements.

CE4034 - BUILDING ENERGY SYSTEMS
ECTS Credits: 3

School of Engineering

Rationale and Purpose of the Module: This module uses the Dwelling Energy Assessment Procedure (DEAP) as a framework for introducing the fundamentals of building environmental and energy systems so that the learning outcomes are realised:

Syllabus: Dwelling Energy Assessment Procedure DEAP
- Heat: Introduction to energy, thermal insulation, heat loss calculations, principles of air conditioning.
- Lighting: sources, efficiency and control.
- Ventilation: ventilation, air filters, heat recovery systems.
- Hot Water: Hot water supply, low, medium and high pressure hot water heating, district heating.
- Noise: managing noise.

CE4068 - PROCUREMENT AND CONTRACTING II
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module builds on the construction contracting and procurement topics provided in Procurement and Contracting 1 and further develops the procurement and contracting fundamentals as they apply to the various aspects of the construction industry: including civil, structural, mechanical, electrical and plant elements. In particular the causes and remedies for construction disputes are covered such that the following key objectives are met:

To become familiar with the relevant terminology as it applies to the construction industry.
To develop a strong understanding of the standard forms of construction contracts in use in the industry, both domestically and internationally and making specific reference to the work carried out under the aegis of the various multilateral development banks.
Create an understanding of the role of the construction manager as an agent for the prevention and successful management of disputes.
Develop an ability within aspiring construction managers to appreciate and take full account of the ramifications of their, and other parties', actions in the context of successfully leading and managing complex construction projects.
To reflect the role of ethics in professional practice.

Syllabus: Construction contracts: formation, tendering, conditions, standard forms; areas of dispute and liability; certification process; claims and the importance of the programme in the management of time-related claims; dispute resolution: traditional forms, dispute boards, adjudication, alternative dispute resolution; design liability of professionals and contractors.

CE4026 - OPERATING SYSTEMS 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Study of multitasking operating systems. Study will be confined to single processor systems. A Unix or WIN-32 operating system will be selected as the prime example operating system. The module lab work will teach the student to develop concurrent program solutions. The module includes: concurrency, states, queues, scheduling. Process inter-communication. Memory management. File systems to support multitasking. File sharing, file protection, performance issues. Conditions for deadlock and solutions. I/O devices and device drivers. File security and protection.

Syllabus: 1) Processes: Concurrency, states, queues, scheduling. 2) Process Communication: Mutual exclusion, race conditions, busy-waiting solutions, Test/Set locks, semaphores, monitors, simple message passing, pipes, classical problems. 3) Memory Management: Swapping, virtual memory, pacing, segmentation, performance and protection issues. 4) File systems to support multitasking: File sharing, file protection, performance issues. The UNIX i-node system. 5) Deadlock: Conditions for deadlock and solutions. 6) Input/Output: I/O Devices for multitasking environments, need for design of re-entrant drivers. 7) Computer Security and Protection: User authentication; protection matrix; ACL; capabilities. 8) Case Study: The UNIX Operating System: Origins; Standards; Shells; Utilities; Process Management; Memory Management; File Management; Programming in the Unix environment (Or, equivalent study based on a WIN-32 operating system.)

Prerequisites: CE4204, CE4518

CE4208 - DISTRIBUTED SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module is designed to provide students with a framework for comparing emerging distributed systems, as well as an understanding of the algorithms necessary to support a distributed system. Computing models and data communications will be studied, as well as software development issues relating to the development of distributed applications.

Syllabus: To introduces application design principles and techniques using available web-based technologies (e.g SOAP, Microsoft.NET, Java Services). Reliability and security issues of distributed applications are addressed. Use of cookies and the covert use of applications to provide a community-wide service.

Characterization of Distributed Systems. Tools and technologies used to develop distributed applications. Mechanisms to secure applications from malicious attacks and errant processes. Component based software development (e.g. CORBA, JavaBeans). Service portability via virtual servers. Replication and Fault Tolerance. Study of evolving Web services. The role of the hidden internet for intelligence gathering. Remotely hosted application environments.

Prerequisites: CE4607, CE4206

CE4208 - COMPUTER ARCHITECTURE
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To provide a grounding in the analytic study of computer architecture and an introduction to various architectural styles, e.g., CISC, RISC, and various von Neumann architectures.

Syllabus: Review of Von-Neumann architecture: Brief discussion of evolution in processor design from 1940’s to today. Computer classifications. Flynn’s taxonomy: SISD, SIMD, MIMD. Computer performance measurement: Execution time

Prerequisites: CE4517

CE4702 - COMPUTER SOFTWARE 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Further the students knowledge of a modern object oriented programming language with particular emphasis on classes, objects and Graphical User Interfaces. Understand the concepts of inheritance and polymorphism. Develop the ability to produce moderately complex event driven programs with user interfaces developed using a graphical toolbox.

Syllabus: The following topics will be covered: In depth study of the object oriented principles, abstraction, inheritance and polymorphism. Abstract data types including interfaces, abstract classes. Input and output including files and streams. Introduction to the use of regular expressions to manipulate text files. Introduction to algorithms - efficiency, simple analysis and comparison. Error handling techniques. Binary trees. Recursion. Graphical user interfaces and development of event driven applications. Unique global class naming and creation of class libraries. Code documentation and code reviews. Use case analysis.

Prerequisites: CE4701

CE4717 - LANGUAGE PROCESSORS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce the theory of compiler design and show its application in a simple compiler. An important part of the module is the implementation of a compiler for a simple, Pascal-like, language.


Code generation for register architectures. Introduction to code optimisation techniques.

Prerequisites: CE4703

CG4008 - PROCESS TROUBLESHOOTING
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide the student with skills and knowledge in the field of chemical and biochemical process troubleshooting. To provide the students with a working knowledge of a commercial Computational Fluid Dynamics code via practical computer laboratory sessions.

Syllabus: Characteristics of trouble shooting problems and the methodologies used to solve them. Approaches to the analysis and formulation of solutions to process issues. Data gathering and critical thinking techniques. The use of interpersonal communication skills in handling management issues associated with industrial process problems. Practical methodologies: recognising patterns, cause-effect, reasoning, and selection of valid diagnostic actions; process trouble shooting rules of thumb; formulation of realistic solutions to process problems. Selected process trouble shooting case studies in the chemical and biochemical industries. Process trouble shooting simulation lab. Conservation equations for mass, momentum and energy; Finite-volume method for stirring reactor problems; Construction of geometry, grid generation techniques and discretization using commercial Computational Fluid Dynamics (CFD) solvers; Turbulence modelling; Implementation of boundary conditions.

Prerequisites: CH4405, CH4415

CH4002 - PHYSICAL CHEMISTRY 1
ECTS Credits: 6
Chemical Sciences

Rationale and Purpose of the Module: i. To facilitate the student in understanding the fundamental thermodynamic laws and its qualitative and quantitative applications to chemical systems
ii. To familiarise the students with the energy terms and relations that applicable to chemical thermodynamic systems
iii. To introduce the students to the basic chemical kinetics including the quantitative expressing of the rate of chemical reactions and key kinetic parameters in the chemical kinetics

Syllabus: [Introduction to Chemical Thermodynamics; Heat, Work; Reversible and Irreversible Systems; State functions.]
[First Law of Thermodynamics; Internal Energy; Enthalpy; Standard Enthalpies.]
[Second and Third Laws of Thermodynamics; Entropy, Clausius Inequality; Gibbs and Helmholtz Free Energies.]
[Chemical Equilibrium; variations with temperature and pressure.]
[Introduction to Chemical kinetics; Zero, First and Second Order Rate Laws. Activation Energy and the Arhenius Equation; Accounting for the Rate Laws; Reaction Mechanisms; Steady State Approximation. Michaelis-Menten equation]

CH4004 - PHYSICAL CHEMISTRY 3
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: i. To facilitate students in understanding the fundamental thermodynamic laws and functions that rule a process of change in a physical chemical system.
ii. To provide students with requisite knowledge of analysing physical chemical systems, such as the phase transformation of a pure substance, the mixing and phase transformation of two components, using thermodynamic and derived thermodynamic functions.
iii. To familiarise the students with the phase diagrams and the use of these to analyse the above-mentioned physical chemical system.
iv. To provide the students with basic knowledge of electrochemistry, electrochemical cell and their thermodynamic account.

Syllabus: - 1st Law of Thermodynamics; Enthalpy - Entropy; 2nd and 3rd Laws of Thermodynamics; Clausius Inequality - Helmholtz and Gibbs Energies - Chemical Potential; Fundamental Equation of Chemical Thermodynamics - Physical Transformations of Pure Substances: Phase Diagrams; Phase Stability and Phase Transitions; The Physics of Liquid Surface - Simple Mixtures: Gibbs-Duhem equation; Raoult/Es and Henry/Es Laws - Phase Diagrams: Phase Rule; Two-Component Systems - Equilibrium Electrochemistry: Thermodynamic Properties of Ions in Solution; Electrochemical Cells; Nernst Equation

Prerequisites: CH4003, CH4002

CH4008 - ORGANIC PHARMACEUTICAL CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To build on the functional group chemistry covered in CH4102, CH4103, CH4104 and CH4007. To extend the students' comprehension and working knowledge of functional group chemistry; to expand the range of reagents, reactions and associated mechanisms; to detail how structure and reactivity can be quantitatively correlated; to detail quantitative aspects of acid and base catalysis.

Syllabus: Section A: Regiochemical control: addition of HBr by ion and radical mechanisms, alcohol formation by acid catalysed hydration and via hydroboration; Chemoselective control: Lindlar catalyst and dissolving metal reduction; hydride reducing reagents, Reformatsky reaction; use of protecting groups. Stereocemical control: asymmetric induction, diastereomeric selectivity, Felkin-Anh model; enantiomeric selectivity, chiral hydride reagents (Alpine Borane and Alpine Borohydrides), chiral catalysts -Monsanto catalyst for L-Dopa production.
Section B: Quantitative structure activity relationships: development and use of the Hammett equation; definition of general and specific acid and base catalysis, use of buffers and kinetic data to distinguish between general and specific catalysis, quantitative analysis of data. Named (and other) Reactions: Oral presentation by students on reactions such as Hydroboration, Reformatsky, Dihydroxylation, Mannich Reaction, Reductive Amination, Birch Reduction, Michael Addition, Allylic bromination, Sharpless Epoxidation, Mitsunobu Reaction, Suzuki Coupling, Heck Reaction, Benzoyne chemistry.

Prerequisites: CH4008

CH4012 - GENERAL CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to the general principles of Energetics, Electrochemistry, Kinetics and Structure, building on what they have done in General Chemistry 1.

Syllabus: Energetics: Enthalpy, entropy and free energy; first two laws of thermodynamics; thermochemistry; equilibrium constants and free energy. Electrochemistry: Free energy and cell potential; emf cells and the Nernst equation; electrochemical series; electrolysis cells and Faraday's laws; batteries and fuel cells. Kinetics: Rate equation, rate laws and orders of reaction; factors affecting rates of reaction; activation energy and reaction profile; Arrhenius equation; catalysts. Structure and bonding: Types of chemical bonding, classification of solids and properties. Bonding in relation to the Periodic table. a) molecular compounds: Lewis structures, VSEPR and molecular shape, polarity; nature of the covalent bond, types of covalent bond - sigma and pi, single, double and triple. b) ionic compounds: nature of the ionic bond; unit cells; lattice energy; factors affecting the strength of ionic bonds. Solubility: Factors affecting the solubility of molecular and ionic compounds - energetics, kinetics and structure.

Prerequisites: CH4701

CH4017 - CHEMICAL NANOTECHNOLOGY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: The Chemical Nanotechnology module will
Provide the student with a broad understanding of the principles that underpin nanoscience and nanotechnology. To acquaint the student with synthetic methods for formation of nanostructures and new physical properties that arise. To enable the student to solve problems relating to size dependent physical, optical and electrical properties at the nanoscale.

**Syllabus**: Course will cover: (1) Chemical and physical properties as length scales vary from the macroscale through microscale to the nanoscale. (2) Chemical synthesis and modification including 0D, 1D and 3D incorporating II–VI colloidal nanocrystals. Study of carbon nanotubes, wrapping vectors, tensile strength and electronic properties (3) Kinetics of nanocrystal growth and the organic/inorganic interface. (4) Chemical functionalisation of inorganic nanostructures with organic molecules and the bio/nano interface (5) Industrial applications of nanotechnology, nanosizing of pharmaceuticals etc. (6) Introduction to crystal engineering with emphasis upon the following subjects: Supramolecular chemistry, especially hydrogen bonding. Types of crystalline solids and their characterization. (7) Pharmaceutical materials especially multi-component crystals (cocrystals)–(9) Coordination polymers especially porous metal-organic materials.

**CH4027 - NANOTECHNOLOGY**
ECTS Credits: 6

**Chemical Sciences**

**Prerequisites**: CH4102

**CH4054 - PHYSICAL CHEMISTRY**
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module**: To teach key principles of physical chemistry. To carry out practical work to support and reinforce some of the theoretical aspects encountered.

**Syllabus**: Thermodynamics, heat, work, reversible and irreversible systems, state functions; First law of thermodynamics, internal energy, enthalpy, standard enthalpies, second law of thermodynamics, entropy, Gibbs free energies, Chemical equilibrium; effect of temperature, pressure, concentration, Le Chateliers Principle; Ions in aqueous solution; electrolytic conductivity, Reaction kinetics: zero, first and second order reactions and enzyme kinetics-Michaelis-Menten.

**CH4102 - ORGANIC CHEMISTRY 1**
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module**: To impart to the student an understanding of, an enthusiasm for, and a basic working knowledge of organic functional group chemistry.

**Syllabus**: Alkanes, cycloalkanes, alkenes, alkynes: structural formulae; shape and bonding; nomenclature; isomerism; conformational analysis; free radical and ionic reactions; mechanism of reactions; electrophilic addition; primary, secondary and tertiary carbonium ions. Haloalkanes: nomenclature; substitution and elimination reactions; mechanism of reactions Û S N1, S N2, E1, E2. Alcohols, ethers and epoxides: methods of preparation; typical reactions. Aldehydes and ketones (part 1): methods of preparation; typical reactions - nucleophilic addition, Grignard reaction as a carbon-based nucleophile; keto-enol tautomerism and reaction (bromination) at the a-position.

**Prerequisites**: CH4102

**CH4104 - ORGANIC CHEMISTRY 3**
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module**: To build on and extend the foundation chemistry covered in CH4102 and CH4103; to highlight heterocyclic chemistry as a key part of this extension; to develop the associated chemistry, reactions, biological importance of various heterocyclic compounds; to give the student a basic working knowledge and comprehension of the biomolecules Û amino acids, peptides and carbohydrates; to carry out practical work to support and reinforce some of the theoretical aspects encountered.

**Prerequisites**: CH4103, CH4102

**CH4152 - INTRODUCTORY ORGANIC CHEMISTRY 1B**
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module**: To introduce the student to the fundamental aspects of organic chemistry eg families of compounds (aliphatic and aromatic), functional groups and associated chemical behaviour, nomenclature, structure (2D and 3D), isomerisation; 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 other means.

**Syllabus**: Protein Chemistry:
Amino Acids: structure; synthesis and resolution; stereochemistry; isoelectric point; preparation from a-haloaminoacids; Gabriel Synthesis; Strecker Synthesis. Peptides: Sequence determination: N and C terminal analysis; strategy for synthesis, use of protecting groups and activating agents, solid state synthesis using Merrifield resin.

Carbohydrate Chemistry:
Monosaccharides: aldoses and ketoses; structure and stereochemistry; hemiacetal and hemiketal formation; Fischer Projections, Haworth representation, chair conformation; oxidation and reduction reactions. Disaccharides: Glycosides (sugars as acetics and ketals); structure; reducing and non-reducing disaccharides. Polysaccharides: structure and occurrence.

Heterocyclic Chemistry:
5-Membered ring aromatic heterocycles: structure, aromaticity; electrophilic aromatic substitution reactions reactivity and orientation; 5-membered ring non-aromatic heterocycles: structure and synthesis. Basicity of aromatic /non-aromatic N-heterocycles. 6-membered ring aromatic and non-aromatic N-heterocycles: Structure, properties; electrophilic and nucleophilic aromatic substitution reactions of pyridine; reactivity and orientation; basicity. Azoles and Fused 5-membered ring aromatic heterocycles; Structure, basicity (where relevant); Azines. Nucleic acids. Occurrence/application of all types of heterocycles encountered above. Current trends.

**Prerequisites**: CH4102

**CH4103**
ECTS Credits: 6

**Chemical Sciences**

**Rationale and Purpose of the Module**: To introduce the student to fundamental aspects of organic chemistry eg families of compounds (aliphatic and aromatic), functional groups and associated chemical behaviour, nomenclature, structure (2D and 3D), isomerisation; 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 other means.
Syllabus: Syllabus: Functional Group Chemistry &
Aromatic Chemistry


Aromatic Hydrocarbons: Benzene and Benzenoid Compounds. Aromaticity- Hückel Rule; Aromatic, Anti-aromatic and Non-aromatic Compounds; Benzene and Benzene derivatives: Structural Formulae; Nomenclature, Electrophilic Aromatic Substitution Rxns; Occurrence and Uses (ctd extensively in CH4153).

Alcohols: Structural formulae; Nomenclature; Classification; Physical properties; Acidity; Preparation; Reactions: Oxidation, Esterification. Occurrence and Uses. Ethers: Structural formulae; Nomenclature; Properties and Uses.


Prerequisites: CH4701

CH4202 - INORGANIC CHEMISTRY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to the importance of structure and bonding in determining the properties of substances, and to consider the bonding in molecules and in solids, particularly ionic solids.


Prerequisites: CH4701

CH4304 - ANALYTICAL CHEMISTRY 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide students with an understanding of some key elements of the theory of separation science and their application to analytical techniques


Prerequisites: CH4303

CH4306 - ANALYTICAL CHEMISTRY 4
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To review and extend the student’s existing knowledge and comprehension of fundamental spectroscopic techniques encountered in CH4303, CH4304 and CH4305; to provide the student with an indepth working knowledge and comprehension of various advanced spectroscopic techniques; to emphasise the interpretation of spectral data in an integrated manner through the use of combined spectroscopic techniques; to highlight various applications of the techniques encountered; to encourage self-directed learning through the use of some recommended websites and software.

Syllabus: Mass Spectrometry: Brief review of some basic principals; Fragmentation Patterns; Rearrangements; Interpretation of spectra; Hyphenated techniques. NMR Spectroscopy: 1-D 1H NMR: Review of some basic principals; Relaxation
Processes; Homotopic, enantiotopic and diastereotopic systems; Nuclear Overhauser Effect (NOE); Second-Order Spectral Interpretation. 13C NMR: Theory; DEPT 13Cnmr; NOE, Quantitative13Cnmr; Interpretation of spectra. Solid State 13C nmr (brief). 2-D 1HNNMR: COSY (1H-1H connectivity); NOESY, ROESY (through space 1H-1H proximity), HOSEY; HECTOR (1H - 13C connectivity); INADEQUATE (13C - 13C connectivity); TOCSY (1D and 2D); Interpretation of spectra.

Structure elucidation using combined spectroscopic techniques (of those above).

Laser Raman Spectroscopy: Theory; Comparison with FT-IR spectroscopy; Spectral interpretation of simple organic molecules and carbon allotropes (diamond, graphite and carbon nanotubes).

Problem Sessions/Lab.

Prerequisites: CH4305, CH4304, CH4303

CH4308 - DISCRETE ANALYTICAL METHODS
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: i. To make the student familiar with modern sampling methods and analytical techniques in dealing with samples of various form and under a broad range of industrial and environmental conditions. ii. To provide the student with the requisite level of knowledge of the latest analytical techniques appropriate to the chemical and environmental industry. iii. The develop the students ability to decide on the most appropriate analytical test procedures from sample extraction to ultimate analysis methodology. iv. To facilitate the student in dealing with contract test laboratories, local authorities and the environmental protection agency in matters relating to analytical test methods. v. To provide the student with the capability of developing future in-house chemical and environmental testing methods and equipment

Syllabus: [Sampling Techniques and Design]
- Sources and types of samples: gas/air, liquid/water, solid/soil
- Physical forms and chemical nature of organic and inorganic pollutants in samples
- Sampling time, location and condition for sampling;
- Typical techniques and devices used for sampling gas/air, liquid/water, solid;
- Calculation, conversion and presentation of quantitative information (concentration/units)
- Sampling protocol design: device selection; active and passive sampling; time proportional sampling and flow proportional sampling

[Sample Preparations / Concentration Techniques]:
- Liquid-liquid extraction, Solid Phase Extraction (SPE);
- Solid Phase MicroExtraction (SPME); Operation modes: Normal Phase / Reverse Phase / Ion Exchange-
- Separation/extraction efficiency
- Effect of pH of aqueous solution on the distribution coefficient; quantitative determination of the extraction efficiency of a liquid-liquid extraction;
- Design and applications of sample preparation methods: solvent selection, ads/desorption, breaking-through, use of purge & trap
- Principle of calibration and various calibration methods in use;

[Execution / Facilitation of Analysis and Result Interpretation]
- Sample introduction techniques: direct injection, purge-trap, head-space, thermal-desorption,
- Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC) and their integrated detectors Û TCD, FID, ECD, FPD; P/T; HS, IC, ISE
- Mass Spectrometry (MS), Scan Mode and Single Ion Mode of operation; identification of peak positions and intensity of sample / isotopes on MS spectra, M/Z estimation;

[Sensor Technology]
- Portable testing, disposable sensors

CH4404 - PROCESS TECHNOLOGY 1
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To introduce students to important aspects of safety, process control, and process modelling in chemical and biochemical processing systems.


Introduction to process control: basic control modes e.g. P, PI, PID; control system architecture and dynamic behaviour for SISO processes; controller tuning; control system hierarchies for chemical/biochemical processing plants.

Equipment and instrumentation used in chemical and biochemical processing operations: sensing and measurement; signal transmission; controllers; final control elements.

Process modelling; application of material and energy balances in the formulation of quantitative process models; process characteristics and dynamic response behaviour of first and second order systems.

CH4354 - ANALYTICAL CHEMISTRY FOR THE ENVIRONMENT
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: * To convey that spectroscopy (the interaction of light with matter) provides both a qualitative and quantitative method to determine molecular/atomic structure and concentration
* To introduce analytic instruments and instrumental techniques

SYLLABUS
SPECTROSCOPIC METHODS:
AAS ATOMIC ABSORPTION SPECTROSCOPY
AES ATOMIC EMISSION SPECTROSCOPY
UV/VIS ULTRA-VIOLET/VISIBLE SPECTROSCOPY
IR INFRARED SPECTROSCOPY (& FTIR)

CHROMATOGRAPHIC METHODS:
PARTITION (GLC, HPLC, TLC)
ABSORPTION (GC)
ION-EXCHANGE
SIZE EXCLUSION (GEL PERMEATION)

ELECTROMETRIC METHODS:
POTENTIOMETRIC (PH, ISE)
CONDUCTOMETRIC
CH4554 - ENVIRONMENTAL CHEMISTRY
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide a basis of understanding the chemical processes occurring in the environment, with particular reference to biogeochemical cycles and the chemical ideas underlying environmental problems.

Syllabus: Chemistry of the earth: overall structure, composition, energy flow, inter-relation of the different spheres. Definitions. Concentrations. The hydrosphere: composition; the water cycle; equilibria in aqueous systems, distribution diagrams; water pollution. The lithosphere: composition and structure; weathering; leaching and soil chemistry; mineral resources and pollution; geochemistry; solubility, pH; E-pH diagrams. The atmosphere: composition, chemical processes in the atmosphere; solubility in water; chemistry of acid deposition, greenhouse effect, ozone depletion, photochemical smog. The biosphere: composition, major and minor elements; sources, utilisation and disposal; toxicology of heavy metals and organics, bioaccumulation. Biogeochemical cycles for nitrogen, carbon, sulphur, phosphorus, etc.

Prerequisites: CH4253, CH4252, CH4701

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CH4608 - PLANT AND PROCESS MANAGEMENT 2
ECTS Credits: 6

Chemical Sciences

Rationale and Purpose of the Module: To provide the student with an understanding of a number of key topics in the management of chemical and biochemical processing operations.

Syllabus: Methodologies for the identification, assessment, and control of risks and hazards associated with processing operations, including HAZOP analysis. Costing of chemical & biochemical plants; stages of costing, methods of cost prediction, exponential, factorial etc. Cost updating. Economic evaluation of chemical and biochemical processing projects; pay-back, ROI, NPV, etc. Sensitivity analysis.

Plant location and layout: principles and application.

Environmental impact assessment of chemical and biochemical production facilities.

Industrial sustainability: concepts and practice. Case study of the application of sustainability metrics to chemical and biochemical processing plants.

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CS4004 - SOFTWARE TESTING AND INSPECTION
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to software testing and inspection such that when given a specification and an implementation of a program, the student would be able to write the tests, run them, and report on the errors found.

Syllabus: - Key Terminology: testing, debugging, error, bug, defect, quality, risk, mean-time between failures, regression testing, limitations of testing;
- Test types and their place in the software development process;
- Black-box and white-box testing;
- Program reading and comprehension;
- Refactoring code;
- Inspections, walkthroughs and desk-checking;
- Programming with assertions;
- Using a debugger for white-box testing;
- Reporting and analysing bugs: content of the problem report, analysis of a reproducible bug, making a bug reproducible;
- Test case design: characteristics of a good test, equivalence classes and boundary values;
- Expected outcomes, test case execution and regression testing;
- Requirements for white-box and black-box testing tools;

Prerequisites: CS4013

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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.

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CS4005 - PERCEPTUAL SYSTEMS AND MULTIMEDIA
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Creating an awareness and understand how our senses work in order to perceive the world around us.

Syllabus: Fundamentals of physical dimensions used by human sensation and perception - light, sound, heat, pressure; Fundamentals of the senses of hearing, seeing and touch: physiology and function; Psychophysical measures and correlates of perception; Introduction to Signal Detection Theory; Theories of perception, perceptual organisation, attention, object recognition, depth perception and motion perception; Navigation and Spatial Cognition; Multimodal integration; Memory and training; introduction to theories of mind and their relationship to theories of mediation, communication and perception.

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CS4014 - SOFTWARE DEVELOPMENT PROJECT
Rationale and Purpose of the Module: This module is intended to provide the student with an opportunity to undertake a semester-long software development project. A student will gain experience of working in a team and the confidence to tackle a large software system.

Syllabus: A substantial semester-long software project is set. Students, working in teams, produce a complete implementation. A partially specified project is presented. Students complete the requirements and then take the project through the design, coding and testing stages. The language and technology of implementation depends on the type of project specified but will generally allow students as much free choice as possible. (Lectures and labs will run from weeks 1 to 5 inclusive). These along with tutorials during this period will build on the knowledge gained in the previous courses. During the remainder of the semester students will meet with their assigned supervisor to discuss their work to date in a tutorial setting on a regular basis.)
Rationale and Purpose of the Module: This module provides an overview of the discipline of Interaction Design, and of its origins and conceptual and methodological basis. The topics discussed include:
- Overview of literature dealing with issues related to designing interaction (multidisciplinarity, variety of conceptual approaches, etc.).
- Exploration and analysis of various approaches to interaction design as a discipline.
- In depth discussion of notions of interactivity and interaction, and of the role of the interaction designer.
- Discussion of notions of narrative and narrativity.
- Analysis of different media and their interaction capabilities.
- Discussion of interaction design methodologies (data analysis, concept generation and development techniques, interaction design communication).

Syllabus: This course will provide the student with an understanding of the key elements required for the design of interaction. After a consideration of basic principles of design, the key features of narrativity and interactivity will be explored and analysed. The potential of different kinds of media to support interactivity will be studied. Methods of involvement of participants in the creation of new media will also be covered.

Prerequisites: CS4031

CS4056 - MOBILE APPLICATION DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students on digital media and music technology programmes to the creation of content and the development of applications for mobile devices.

Pre-Requisite Modules:
(CS4061 Media Programming 1 & CS4082 Introduction to Web Development)

OR
(CS6221 Programming Protocols for Musical Systems)

Syllabus: Challenges of designing applications for mobile devices.
- Design dimensions for mobile applications: scenario-related dimensions, interaction-related dimensions, user-related dimensions, data/content related dimensions and communication-related dimensions.
- Designing for multiple mobile platforms and multiple displays: practical guidelines, techniques, standards and best practices.
- Content optimization and design skills for mobile application development.
- Creation of raster and vector visual assets for mobile applications using a variety software products.
- Creation of applications for mobile devices using a development environment suited to the programming skills and abilities of the students that will take this module.
- Applications will work with images and sound; the creation of animated applications; list manipulation; parsing comma-delimited files and XML files; work with databases; text-to-speech and speech-to-text; read and respond to sensors, communicate with web APIs.

Prerequisites: CS4061, CS4082, CS6221

Prerequisites: CS4042

CS4064 - DIRECTED STUDY DMD 2
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Students will extend their knowledge and the approaches needed to undertake: A research based literature review of a given theme. A critical appreciation based in listening and seeing works representative of a theme.

Syllabus: Developments in technology and design post 1945.
- Multimedia.
- Digital Video.
- Interactive environments.
- Digital and interactive art.
- Computer graphics.
- Computer networks.
- Online communities.
- Personal computing.
- Ubiquitous and mobile computing.
- Virtual reality.

Prerequisites: CS4042

CS4065 - WEB INFRASTRUCTURE
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will encourage students to develop standards-compliant web applications. Students will learn how different capabilities can be provided by competing technologies. A substantial web development project will be undertaken by students - the nature of the application domain of this undertaking will depend on the students chosen programme of study.
Syllabus: This module deals with topics and methodologies for Interaction Design work. The topics include:

- Overview of the latest literature and current practical projects in interaction design
- Exploration and evaluation of practical approaches to interaction design as a discipline in a variety of current settings, and particularly of Participatory Design methods
- Exploration of novel interaction modalities around tangible, ubiquitous and wearable devices.
- Application and adaptation of interaction design methodologies to specific design settings.
- Discussion and review of sensitive design settings such as healthcare, safety-critical environments, education, etc.
- The role of high-fidelity prototypes in developing the interaction design process. The discussion and analysis of these topics will be based around practical interaction design assignments.

CS4082 - INTRODUCTION TO WEB DEVELOPMENT
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will introduce students to the concepts and techniques underlying the World Wide Web, such that they will gain a working knowledge of how to structure and build websites. Students will be introduced to databases and SQL in order to create dynamic, data-driven web applications. Examples and project work will be relevant to each group of students in so far as possible.

Syllabus: Introduction to the world wide web: web browsers, web servers and clients, uniform resource locators, the hypertext transfer protocol (HTTP), processing HTTP requests and responses, world wide web consortium (W3C), static and dynamic content. Document content and structure, mark-up languages, elements and attributes, document type definition (DTD), hypertext and hypermedia. Hypertext MarkUp Language (HTML); standard HTML document structure, HTML syntax, tags, text formatting, colours, images, hypertext links, absolute and relative referencing, list, tables, frames and forms. Consideration when including audio, video and graphics; differentiating between file formats. Embedding PHP in HTML; assigning and using variable values, saving form input in variables, simple data types, etc.
detecting the data type of a variable, using operators: arithmetic, relational, logical; string operators, auto increment/decrement operators, operator precedence; selection and looping constructs.

Sessions and cookies: creating a session and registering session variables, destroying a session; setting cookies, retrieving cookie data, deleting cookies.

File manipulation: reading data from and writing data to files.

Introduction to relational databases: tables, records, fields, primary keys and foreign keys.

Introduction to Structured Query Language (SQL); creating tables: specifying field data types, retrieving, inserting, editing and deleting records.

Connecting to a database in PHP and executing SQL commands.

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**CS4084 - MOBILE APPLICATION DEVELOPMENT**  
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** The module will focus on the tools and environments that exist to help developers create real world applications that run on wireless and mobile devices. A strong emphasis will be placed on providing students with hands on experience in the programming and testing of applications for mobile devices. Throughout this module students will use an object oriented programming language, basic APIs and specialised APIs to develop applications for mobile devices.

**Syllabus:** Challenges to be faced when developing applications for mobile devices. Platform specific mobile applications and/or mobile web applications; mobile application lifecycles.

Mobile applications and their architectures.

Overview of operating systems (OSs) and Application Programming Interfaces (APIs) to choose from when developing applications for mobile devices.

Comparison of native development environment options; software development kits (SDKs) and emulators.

Installing and configuring the development environment.

Managing application resources; designing user interfaces; data storage and retrieval options; synchronization and replication of mobile data.

Communications via network and the web; networking and web services; wireless connectivity and mobile applications.

Performance consideration: performance and memory management; performance and threading; graphics and user interface performance; use various facilities for concurrency.

Security considerations: encryptions, authentication, protection against rogue applications.

Location based application; location API.

Packaging and deploying applications for mobile devices.

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**CS4092 - PROGRAMMING 2**  
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To continue with the design approach in Programming 1, through a series of design exercises given in tutorials. To introduce some classical algorithms, data structures, and other programming constructs, in the design and implementation of more complex programs. To place an emphasis on functional abstraction.

**Syllabus:**

a. A more detailed (from Programming 1) examination of functions and parameter types.

b. Introduction to two-dimensional arrays and their manipulation.

c. Sorting and searching techniques; problem solution considerations.

d. A more detailed (from Programming 1) examination of classes, objects and encapsulation.

e. Introduction to common data structures: Stacks, linked lists, queues.

f. Introduction to abstract data types

g. Recursion: defined; iterative and recursive solutions; recursion as a problem solving technique; designing recursive algorithms; implementations of recursion.

h. An introduction to file processing; file design considerations; streams; file types; file processing algorithms.

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**CS4112 - COMPUTER SCIENCE 2**  
**ECTS Credits: 6**

**Computer Science & Information Systems**

**Rationale and Purpose of the Module:** To introduce students to formal ways of thinking about programs, in terms of their syntactic structure, their design, and formal assertions about the progress of a computation.

**Syllabus:**

- Review of set theory. Union and intersection of sets, Cartesian, product functions as sets of ordered pairs. Review of logic propositions and logical connectives.
- Review of difference between variables in mathematics, and in imperative Programming Languages. Constructing mathematical/expressions about individual statements, and program fragments. Preconditions and Post conditions Proof by induction of assertions about simple while programs.
- A semi-formal approach to structural induction, as a generalisation of induction over the natural numbers, together with its use in describing syntax of arithmetic and Boolean expressions.
- Using Grammars to describe formal languages or notations, regular grammars and context free grammars. BNF and EBNF, Syntax charts. Detailed application to specifying syntax of selected Programming language.
- Introducing static-semantic constraints into programming languages.
- Data Type Constructors, enumerated type, record, tagged and untagged variants, arrays, and sequential files, and their underlying sets of values as finite sets, Cartesian products, disjoint and normal Union, finite maps. Type completeness Copy semantics. Parameter-passing mechanisms and reference variables.
- Formal basis of some commonly-used simple design patterns such as extending a binary operation to an n-ary operation, composing a function with another function, including a function whose domain has been restricted, and grouping functions defined over the same domain into a single function.

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**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, heapsort, 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.

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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.

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CS4157 - SOFTWARE QUALITY
ECTS Credits: 6

Computer Science & Information Systems

**Rationale and Purpose of the Module:** To provide an understanding of the processes and techniques used to develop and maintain quality software.

**Syllabus:** Software quality assurance and standards; Software Inspections; Process versus Product quality and quality characteristics; Software testing techniques and strategies; Software Maintenance; Quality metrics; Evolution of software process; Introduction to ISO15504; Configuration Management.

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CS4162 - VIRTUAL WORLDS
ECTS Credits: 6

Computer Science & Information Systems

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CS4174 - PERFORMANCE TECHNOLOGY 1
ECTS Credits: 6

Computer Science & Information Systems

**Rationale and Purpose of the Module:** Students will develop their knowledge of performance technology in the context of digital musical instruments through a combination of laboratory based small group project work and lecture based learning.

**Syllabus:** This module will focus on the design and the creation of digital musical instruments. Students will design and build a musical instrument - a complete system encompassing musical controller, algorithm for mapping input to sound, and the sound output itself. Students will focus on improvisation techniques as they prepare their prototypes for live performance. The module will culminate in a musical performance where students will demonstrate their instruments. Key topics will include:
- Sensor system implementation for live music performance.
- Software implementation of real time performance systems.
- Aesthetic issues in digital musical instrument design and build a musical instrument creation of digital musical instruments. Students will prepare their prototypes for live performance. The module will culminate in a musical performance where students will demonstrate their instruments. Key topics will include:
- Sensor system implementation for live music performance.
- Software implementation of real time performance systems.
- Aesthetic issues in digital musical instrument
CS4416 - DATABASE SYSTEMS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Databases, particularly relational databases and database management systems (DBMSs) are central in the design and development of modern information systems. Understanding their structure and skills in their application are fundamental aspects of a proper foundation in any domain of software development.

Syllabus: The concept of a DBMS and DB Architectures are introduced. This module will build upon the notion of a database as introduced in Information Modelling and Specification including revision of those concepts previously introduced, i.e. the relational data model, including issues, such as Integrity Constraints, SQL, and Views.
- Concepts of databases and DBMSs;
- Database Architectures;
- Revision of the Relational Model; SQL Tables, Views and the DDL; Referential and Existential Integrity Constraints;
- Normalisation: Functional Dependencies; 1st, 2nd 3rd, 4th Boyce Codd and Fifth Normal Forms;
- Technologies: Transaction Management; ACID properties; Security; Data Storage & Indexing; Triggers & Active DBs; Query Optimisation; Distributed Architectures;
- Use of embedded SQL, cursors, triggers;
- Object DBs and Object Relational DBs;
- Data Warehousing, Decision Support & Data Mining;
- Emerging Technologies;
Prerequisites: CS4513

CS4457 - PROJECT MANAGEMENT AND PRACTICE
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To examine the processes by which the development of computer-based information systems are managed, and the considerations needed for successful implementation of such systems.

Syllabus: Why management of IS projects can be the deciding factor for success or failure; responsibilities for managing medium to large-scale information systems development projects; from project initiation to systems implementation; the tools and techniques applicable to planning, monitoring and controlling a project.

CS4458 - COMPUTER SUPPORTED COOPERATIVE WORK
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will introduce students to the CSCW and groupware field. It will cover basic concepts in the field and include an examination of software systems designed to support cooperative work - their design, use and evaluation.

Syllabus: The limitations of traditional HCI; Understanding the work context; Cooperative work; Methods for observing work - field studies and ethnography; Coordination mechanisms; Examination of variety of commercial and research collaborative systems; Constructing common information spaces; Examining collaborative learning in the workplace; Evaluation methods for CSCW;

CS4566 - REQUIREMENTS ENGINEERING
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: System and software requirements exist at the boundary between the often conflicting needs and expectations of stakeholders and the myriad capabilities and potential of software to fulfil them. Special rare skills are essential in order to adequately elicit, specify, verify, validate and then manage both the scope of the system and the software requirements themselves.

This module aims to introduce students to the necessary skills and make them aware of the real challenges that are presented by the requirements task.

Syllabus: System and software requirements
- The Requirements Engineering Process
- Stakeholders and their role in RE
- Requirements and Design
- The elicitation and discovery of requirements: RAD, Task Analysis
- Elicitation techniques: Prototyping and Scenarios, Viewpoints
- Discovering and Inventing Requirements: CRC Cards
- The modelling and analysis of requirements
- Problem Frames and modelling
- A comparative review of modelling techniques
- Perspectives and values in modelling methods
- Requirements Documentation: Standards and Templates
- Quality Measures of Software Requirements
- Documenting Functional Requirements
- Techniques for writing requirements
- Writing non-functional requirements
- Communication techniques
- Management of requirements; Change control
- Requirements Management Tools: Requisite Pro; DOORS, etc.
- Organisational and Social Issues
- Requirements validation: reviews and walkthroughs
- Negotiation and agreement of requirements

Prerequisites: CS4125

CS4826 - HUMAN-COMPUTER INTERACTION
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The objective of this module is to develop an understanding of the issues involved in the increasingly important area of human-computer interaction. The module will provide a broad introduction to a variety of topics concerning user requirements, user interface design, usability studies, integrating human factors in software development, and social and organizational factors involved in implementing systems. It will examine guidelines and standards, as well as emerging interaction paradigms. The widespread adoption of graphical user interfaces (GUIs), and the potential afforded by new developments such as groupware, multimedia, hyper-text, and virtual reality systems all require that even greater attention be paid to how these technical developments can be packaged and presented suitably to the "user".

Syllabus: The module addresses the nature of HCI. Specifically it covers the topics of: understanding the user, human information processing, perception, interfaces and interaction, input and output devices, use & design, the design process, requirements, evaluation, usability methods and tools, empirical and analytical methods, standards & guidelines, mobile technology, information appliances, social and organizational constraints, intelligent agents, and future trends.

CS4815 - COMPUTER GRAPHICS
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: Given the role of graphical user interfaces in the computing devices today this programme should include at least one module relating to computer graphics.

Syllabus: Physical devices for graphics systems: Input and Output devices, Raster Scan devices, RGB colour systems, Video Memory Models; Implications of these for interactive graphics systems.

General structure of Interactive Graphics systems: Issues involved in digitising analogue information: antialiasing techniques; Design and implementation of drawing algorithms for basic shapes: Issues and techniques; Establishing Device, Language and Application Independence: Conceptual levels in graphics systems; Frames of reference and Viewing systems;

Control and manipulation of graphics elements: Input and Output primitives, Clipping functions, Transformation (rotation, scaling, translation, reflection, shears) and Segmentation functions; Transformations in 3-D; Projections; Viewing in 3D; Drawing Curves: Techniques, Properties of different types of curves;

Basic Modelling: Representation of surfaces via polygons; Realism; Hidden surface removal; Surface generation via bi-cubic curves; Rendering.

CS4925 - BUSINESS INFORMATION TECHNOLOGY 1
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module has two key objectives: 1) to introduce students to Information Technology/Information Systems in the overall business/social context and 2) to develop a more critical perspective on the role of IT/IS in society.

- Social Context: Socio Technical Environment; Defining the Socio Technical Environment (Individual, Group, Organisation and Society); Understanding and Capturing the Socio-Technical Environment.
- Organisational Context: Information Systems Planning and Strategy; Developing an Information Technology
Plan; The Role of Managers in Technology Planning; Planning as Emergent.
- Market Context: High Technology Customer Behavior; Customer Decision Process; Lead Users; Business Information Technology Adoption; The Origins and Development of Innovation Diffusion Theory; Technology Adoption Life Cycle.

CU4006 - TRAVEL LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To introduce students to the genre of travel writing. To analyse different forms of travel writing from fictional to non-fictional, from historical sources to postcolonial approaches.

Syllabus: This module will cover the genre of travel literature, giving a background to the origins and following developments up to the present day and by examining different forms of travel literature. After an introduction to the history of travel literature, utopian literature as well as colonial representation of the aNew World/E will be examined in the period dating from the late fifteenth century through to the final decades of the seventeenth century. Comparing and contrasting the representations of America found in the reports of the earliest Spanish explorers with that found in later Puritan accounts, this element of the course will analyze the European aæinventionÆ of America as a pre-lapsarian utopia.

The main part of the module will then concentrate on Ireland as a travel destination, seen from an outsiderÆs perspective through the eyes of European visitors from the Middle Ages up to the twentieth century and compared with travel accounts of Irish writers. Questions of identity, cross-cultural awareness and language as a communication tool will be analyzed.

CU4018 - EUROPEAN CINEMA FROM THE 1960s TO THE PRESENT
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give students a comprehensive overview of the major currents and trends in European cinema in the post Second World War period with the advent of the French Nouvelle Vague being considered as a watershed event. To build on students prior knowledge and exposure to film studies and enhance their ability to analyse and critique films.

Syllabus: This module will build on students prior experience of film studies and will involve a comprehensive overview of the major cinematic movements in contemporary Europe over the last fifty years with an introduction to some of the major directors of this period and their oeuvre. The module will also examine the techniques of film as employed by these directors, their critical approaches and how major theoretical movements have been influential in their work. It will lastly consider the impact of the digital revolution on film making and the film industry.

CU4014 - ANALYSING MEDIA DISCOURSE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: * Students will acquire knowledge about the linguistic features of media texts;
* Students will acquire skills to enable them to engage critically with a range of media texts;
* Students will be exposed to both qualitative and quantitative methods of analysing media texts;
* Students will acquire specific skills in Critical Discourse Analysis and Corpus Analysis and multimodal discourse analysis.

Syllabus: Text linguistics: This section of the course will introduce students to a range of concepts required to analyse media texts (e.g. morphology, syntax, semantics, grammar, lexicon, pragmatics) (3 weeks) Critical Discourse Analysis: Theory and Practice (3 weeks) Æ students will carry out an in-depth qualitative analysis of a number of media texts on a chosen topic. Corpus Textual Analysis: Theory and Practice (3 weeks) Æ students will build up a corpus of media texts on a particular topic from a variety of media and then analyse them using corpus linguistics software. Multimodal Discourse Analysis: Theory and Practice (3 weeks) Æ students will carry out a project in the area of New Media discourse analysis.

CU4012 - CULTURAL STUDIES 2: LANGUAGE AND CULTURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give a European perspective on the film industry. To give students the theoretical tools to analyse film. To give a European perspective on the film industry.

Syllabus: This module will make the distinction between knowing a lot about films and being able to address the question what is cinema. To this end the module will examine the techniques of film, critical approaches and how major theoretical movements have been applied to this field.

Prerequisites: CU4025

CU4026 - HOW TO READ A FILM: INTRODUCTION TO FILM STUDIES
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: * To introduce students to the field of film studies. * To give students the theoretical tools to analyse film. * To give a European perspective on the film industry.

Syllabus: This module will make the distinction between knowing a lot about films and being able to address the question what is cinema. To this end the module will examine the techniques of film, critical approaches and how major theoretical movements have been applied to this field.

Prerequisites: CU4025

CU4012 - CULTURAL STUDIES 2: LANGUAGE AND CULTURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This course is designed to serve as an introduction to basic concepts and theories in the study of language and culture. The various branches of the study of language and culture will be introduced and discussed in class lectures, with particular attention being paid to issue of globalisation. The more specific objectives of this course are:
* Recognize the fundamental relationship between language and culture.
* Describe current perspectives on the nature of language and culture from an applied linguistic context

Syllabus: Students will gain an in-depth knowledge of the relationship between language and culture. The course will begin by introducing the Sapir-Whorf hypothesis and will then look at a further three core sections, namely:
(1) Culture and language in use
(2) Culture, language and the individual
(3) Culture, language and society
CU4116 - CULTURAL STUDIES 4: CULTURAL THEORY
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give students the opportunity to study, in depth, the writings of key cultural theorists of the 20th century. To develop an awareness of the place in theory in cultural practice. To develop skills of presentation, appraisal and comparison of material of high theoretical complexity.

Syllabus: This module will cover a number of different theorists and theoretical positions in sequence. The relevant theorists will include Matthew Arnold, Friedrich Nietzsche, Sigmund Freud, Laura Mulvey, Karl Marx, Theodor Adorno, Roland Barthes and Jean Baudrillard. The theoretical positions covered will include humanism, psychoanalysis, feminism, Marxism, neo-Marxism, structuralism, poststructuralism, semiotics and postmodernism.

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CU4118 - EUROPEAN CINEMA
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give students a comprehensive overview of the major currents and trends in European cinema. To develop knowledge and exposure to film studies and enhance their ability to analyse and critique films.

Syllabus: This module will involve a comprehensive overview of the major cinematic movements in modern Europe with an introduction to some of the major directors and their oeuvre. The module will also examine the techniques of film as employed by these directors, their critical approaches and how major theoretical movements have been influential in their work.

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DM4006 - ENGINEERING DESIGN
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To introduce the student to product engineering design systems and techniques. To provide experience in product design and concurrent engineering. To develop skills in developing automated process plans using variant and generative approaches. To provide the students with experience in the use of finite element methods as part of the design cycle. To focus on the engineering of the solution by providing hands-on experience in the analysis of case studies, supplemented by an overview of the theoretical analysis.


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DM4016 - PRODUCT AUTOMATION
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To inform the student of the need to design and manufacture products in an environmentally sustainable manner. To illustrate how product design can impact on production line feeding mechanisms.

Syllabus: Mechanics Velocity, displacement, angular velocity, torque, power, work etc.

Circuitry:
DC Circuits, AC Circuits, - involve making simple circuits, PCB manufacturing etc

Motors
DC, AC, Stepper motors, how they work, picking the correct type, sizing the motor.

Industrial Robotics
Robot anatomy, joints and links, drive systems, control systems, grippers, sensors, applications material handling, assembly linked to product design design for manufacture. Numeric Control, features of CNC, applications of CNC, Robot programming, CNC programming.

Pneumatics & Hydraulics
Sizing systems, control of systems, design of systems, electro-pneumatics.

Automated Assembly
Linked to the DFM module, tools techniques, quality requirements, tolerances, feeding mechanisms, magazines feeders, vibratory bowl systems.

Vision Systems
Operating principles, industrial applications, advantages, disadvantages.

Vision Systems
Operating principles, industrial applications, advantages, disadvantages.

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DM4028 - ENGINEERING SUSTAINABLE PRODUCTS
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To inform the student of the need to design and manufacture products in an environmentally sustainable manner. To illustrate the use of life cycle analysis software to ensure that the lowest impact material selection, manufacturing processes etc. are adhered to. To identify the various recycling/recovery processes available to ensure that the student designs a product with these solutions in mind at end of life. To identify key alternatives to existing fossil fuels in
energy creation and thereby help promote a more sustainable manufacturing environment.

**Syllabus:** Design for Environment
Strategies, tools, key fundamentals such as design for dematerialisation, design for product recovery and design for capital protection and renewal.

Sustainable Manufacturing
Alternative energy supplies, solar, wind, geothermal, alternatives to oil such as bio-diesel, gaining energy from recycling materials or waste e.g. incineration, pyrolysis. Material properties, material property charts, material selection, case studies.

Recycling Technologies
Magnetic separation, shredding, eddy current separation, infra red separation, examination of waste streams, destruction disassembly versus step by step disassembly. Design obstacles to disassembly, design techniques to encourage disassembly and thereby encourage effective recycling/recovery.

Lifecycle Assessment
Overview of total product life cycle, from raw material selection to transport to manufacturing processes and systems to packaging and the impact individual decisions regarding the product have on the environment. Using LCA software to calculate the cost to the environment.

Reverse Engineering
Techniques, systems of approaching systematic reverse engineering to enable design for the environment and to learn from previous mistakes. Product redesign can take the form of incremental or radical changes.

Legislation
WEEE directive, RoHS directive, ISO 14062 environmental aspects to product design, ISO 9000.

Design for End of Life
Examination of fastening technology, standardisation of techniques, placement of access points, location of high value/hazardous materials.

**DM4038 - ADVANCED MANUFACTURING**
**ECTS Credits: 6**

**School of Engineering**

**Rationale and Purpose of the Module:** To give an in-depth examination of advanced manufacturing

methods currently used in Ireland. This will introduce students to current state-of-the-art manufacturing technology through a combination of lectures, workshop component manufacture and industrial presentations / site visits. It will also introduce the students to novel energy efficient methods of manufacture.

**Syllabus:** Die casting / injection moulding
The general principles of the diecasting process.
- Diecasting of metals and alloys
- Die design principles.
- Material selection and component features used in the manufacture of dies.
- Injection mould tool design.
- Design of cavity layout
- Gating system and runner system
- Design of ejection systems and sliding cores.

Metal forming
- Rolling
- Forging
- Piercing, blanking and bending process
- Combination and Progressive Die Design
- Cutting tools / machining
- Mechanics of cutting, tool/chip temperature, tool wear and failure,
- Cutting tool materials, high-speed-steel, carbides, ceramic and coated cutting tools
- ISO codes for inserts and holders, cutting fluids.
- Tool economics, tool life for maximum production and minimum cost.
- Advanced manufacturing techniques
- EDM, ECM, Ultrasonic, abrasive jet and laser beam machining
- ICT manufacturing methods
- Standard packages
- IC fabrication process
- Printed circuit board manufacture

**EC4006 - Intermediate Macroeconomics**
**ECTS Credits: 6**

**Economics**

**Rationale and Purpose of the Module:**
Macroeconomics deals with the economy as a whole. It is not primarily concerned with how the individual or firm behaves, but how together or in aggregate households or firms behave. It seeks to explain why unemployment is high or low; why prices are rising or falling; why interest rates or the cost of borrowing are high or low.
This course aims to build on what you learned from your first year macroeconomics course, EC4102. We will pay particular attention to key macro models including the IS-LM and the Aggregate Demand tyre Aggregate Supply (AD-AS) framework. At the same time we will cover all the main subject areas of modern macroeconomics, from unemployment to inflation and open economy issues. By the end of the course you should gain an insight into a number of macro models, their relative strengths and weaknesses, and their policy implications.

**Syllabus:** 1. Macroeconomics: data and method; key macroeconomic variables.
- National Income: Measurement issues
  (MT Chapter 1, 2; LW Chapter 1, 23)
- National Income Determination: short and medium run view
  - The Simple Keynesian model
  - IS-LM analysis
  - AD-AS model; introduction to monetary and fiscal policies
  - (MT, Chapters 9-10; LW 3, 17)
2. Inflation
- Measurement, cost and policy prescriptions
  (MT, chapter 4, LW chapter 7)
3. Unemployment
- Measurement, cost and remedies
- Inflation-unemployment trade-off: the Phillips curve
  (MT Chapter 6, 13; LW Chapter 21, 22)
4. Growth Theory
- Exchange rate regimes
- PPP and IRP
- Economic policies
  (MT Chapter 5, 12; LW Chapter 9, 10, 18)
5. The Open Economy
- The economy in the very long run: traditional and anew growth theories (MT, chapter 7,8)
6. Special Topics:
- Institution and Macroeconomics: Political regimes and Macroeconomic performance (reading list to be supplied later)
- Environment and sustainability (reading list to be supplied later).
10. Summary & Review.
EC4014 - INTERNATIONAL ECONOMICS  
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The world economy is becoming increasingly integrated and interdependent in terms of the economics ties linking countries and regions. Three ways in which countries are linked are through the exchange of goods and services (trade), investment flows (capital mobility) and migration (labour mobility). This module builds on introductory micro and macro economic principles in order to provide students with the tools of analysis necessary to examine the international economy and to explore the key issues that are shaping our global economy. The emphasis is on current issues in international economics. In this module we examine why international trade and factor mobility, as well as concentrating on how economics and politics interact to understand the existence, or absence, of certain policies at an international level.

Syllabus: The module is divided into six sections set out below. Each topic will have a corresponding problem sheet which students should work through as an aid to understanding the material presented in lectures. Further detailed references and readings for each topic, where relevant, will be given in lectures.

Section I Introduction and Context

Topic 1 Introduction and Context

Section II International Trade Theory

Topic 2 Comparative Advantage

Topic 3 The Standard Trade Model

Topic 4 The Heckscher-Ohlin Trade Model

Section III International Trade Policy

Topic 5 Tariffs

Topic 6 Nontariff Trade Barriers

Section IV Integration and Investment Relations

Topic 7 Economic Integration

Topic 8 International Resource Movements

Section V Balance of Payments and Exchange Rates Markets

Topic 9 Balance of Payments

Topic 10 Foreign Exchange Markets and Exchange Rates

Section VI The International Economy in Operation

Topic 11 Exchange Rate Regimes

EC4018 - MONETARY ECONOMICS  
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This course in Monetary Economics covers topics in Financial Markets, Financial Institutions, Central Banking, International Finance and Monetary Theory. These topics are discussed at various stages in the course. The central theme is to develop a dynamic monetary model of a small, open economy. The Course Outline (see below) explains how this is achieved and at what point the other topics are examined. Among the policy issues discussed are: economic adjustment to asymmetric shocks given the constraints of monetary union; the operations and policies of the European Central Bank; the transmission of monetary policy in the Euro-area, and the determination of interest rates.

Syllabus: 1. Introduction to the Theory of Income Determination

- Equilibrium in the Goods and Services Market
- Deriving the SRAS model
- Adjusting to Demand-side Shocks
- Adjusting to a Supply-side Shock

2 Money and Banking

- Money Creation in a Modern Economy
- The money multiplier
- The Role of a Central Bank
- Seigniorage
- Lender of last resort
- High-powered Money and the Money Multiplier
- Instruments of Monetary Policy

3 Money and Interest Rates in a Closed Economy

- The Demand for Money
- Money Market Equilibrium
- Aggregate Demand and Interest Rates
- Monetary Policy and the Keynesian, Classical Debate
- Monetary Financing

4 The IS-LM Model

- Equilibrium in the Goods Market: The IS Curve
- Equilibrium in the Money Market: The LM Curve
- Equilibrium in the Goods and Money Markets
- The Relative Effectiveness of Fiscal and Monetary Policy in the IS-LM Model
- The IS-LM Model and Aggregate Demand

5 The Phillips Curve and the Inflation-Unemployment Trade-off

- The expectations-augmented Phillips curve
- Deflation, Expectations and Credibility
- The sacrifice ratio
- The Augmented Phillips Curve: Evidence from the Euro-area
- Estimates of the natural rate of unemployment
- Recent Developments Relating to the Phillips Curve
- The Phillips Curve and the AD-AS Model

6 The Mundell-Fleming Model

- Internal and External Balance
- Introduction to the Mundell-Fleming Model
- The Model Under Fixed Exchange Rates
- The Model Under Floating Exchange Rates
- Exchange Rate and Country Risk
- Economic Policy, Output and the Current Account
- The Aggregate Demand Curve

Guest Lecture Dr Alan Ahearne NUI, Galway
- How has the ECB responded to the financial crisis? Long term refinancing operations (LTRO) and Outright Monetary Transactions (OMT).
- How has the Federal Reserve responded to the financial crisis? Quantitative easing (QE).

Guest Lecture John Rowe Financial Markets Division, Central Bank of Ireland
- Monetary Policy Framework
- National Central Bank’s and the Liquidity Position of Commercial banks.
- Forecasting Liquidity Facilities.
- Reaction of Central Bank’s to the Financial Crisis.

7 European Monetary Union and the European Central Bank
- The Political Benefits of EMU to Ireland
The Economic Crash of 2008 and Its Aftermath

Lectures: Week 1 Consumer Theory
Week 2 Producer Theory
Week 3 Markets, exchange
Week 4 General Equilibrium, Computable General Equilibrium
Week 5 Game theory and Policy
Week 6 Assymetric Information
Week 7 Long Run 1: The "Solow Model" with Human Capital
Week 8 Long Run 2: The Ramsey Problem
Week 9: Medium and Short Run: IS/MP/PC Model with uncertainty
Week 10: Policy Application: Open economies in monetary unions
Week 11: Policy Application: funding pension systems in ageing societies
Week 12: Policy Application: Hyperinflations, deflations.
Labs: Weeks 3-6, mathematical prerequisites, 7-9, Data-based labs, 9-11, writing workshops.

Prerequisites: EC4101, EC4102, EC4004

EC1002 - MACROECONOMICS
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The purpose of this course is to introduce the student to the principles underlying the Macroeconomy. This is the study of how aggregate economic variables (such as the real growth rate, inflation and unemployment) interact and how the policy-maker (Government and Central Bank) can influence their behaviour. Following an introduction to the key macroeconomic variables and globalisation, a model of how the macroeconomy operates (the theory of income determination) is developed. This model is then expanded at various stages to include the money market and the foreign exchange market. The expanded model is used to discuss issues in macroeconomic theory and policy such as role and operations of the European Central Bank (ECB) and the relative importance of fiscal, monetary and exchange rate policies. The course concludes by discussing recent trends and economic issues relating to the Irish economy.

Syllabus: Topic 1. Introduction to Macroeconomics
Irish macroeconomy, political economy, macroeconomic constraints, globalization, macroeconomic models and the time horizon, a brief history.

Aggregate production function, measuring the output of nation’s, the national income accounts, adjusting for inflation, the business cycle, the long-run performance of the Irish economy.

Topic 3. Inflation
Measuring inflation, the Irish inflation record, the effects of inflation, deflation.

Topic 4. The Labour Market and Unemployment
The labour market, the natural rate of unemployment, frictional and structural unemployment, cyclical unemployment, why doesn’t the labour market clear?, the costs of unemployment, reducing unemployment, unemployment in Ireland, unemployment in the Euro area.

Topic 5. Introduction to the Theory of Income Determination
Macroeconomic models, Keynes’s General Theory, equilibrium in the goods and services market, aggregate demand, aggregate supply, equilibrium, adjusting to demand-side shocks, adjusting to supply-side shocks, real GNP and unemployment.

Topic 6. Consumer Theory and the Income Determination
Income, consumption and savings, personal income, consumption and savings in Ireland, the Keynesian multiplier.

Topic 7. Introduction to the Theory of Fiscal Policy
Fiscal policy, assessing the stance of fiscal policy, problems in implementing stabilization policy, taxation and the supply-side of the economy, the dynamics of debt stabilization.

Topic 8. Fiscal Policy and Economic Planning in Practice: The Irish Record
Economic planning, Irish fiscal policy in historical perspective, is there such a thing as Expansionary Fiscal Contraction?, the end of history.
EC4108 - CONTEMPORARY ISSUES IN THE GLOBAL ECONOMY
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: An understanding of the main issues confronting the international economy is a pre-requisite to finding solutions to global problems. The recent financial and banking crisis and the attendant severe budgetary and fiscal problems facing many countries (especially Ireland and the peripheral EU countries) has led to some significant re-appraisal of what had become mainstream thinking in relation to economic policy and indeed in some circles market capitalism. Increasingly, much debate in the international economy is polarised between two camps: those who see globalisation as the panacea for solving economic and social problems and the anti-globalisation movement that views the process of globalisation as the main cause of problems. This module seeks to provide the student with a balanced and objective analysis of the main issues confronting the world economy and through the use of economic theory, empirical evidence and objective analysis seeks to distinguish between fact and fiction.

Syllabus: The module will have as its main objective an exploration of the main issues that confront the world economy. While it would be unreasonable to expect one module to cover all the issues in depth the following will be analysed and discussed:

Topic 1: (i) The identification of the causes of the financial crisis and fiscal crises in the world economy and in Ireland. (ii) The current state of the world economy; an overview of the current and future economic challenges facing the globalised economy. (iii) Review of history of the global economy.


Topic 3: (i) The evolution of international monetary and financial system. The role of the multilateral institutions such as the International Monetary Fund (IMF) and the World Bank. (ii) Changing hegemonic role of the US economy in international political economy and the rise of the BRIC economies. (iii) The European integration; why many EU countries formed a monetary union; macroeconomics in the Eurozone.

Topic 4: The economic performance and problems confronting less developed countries; The development prerequisites, the development history: 1945-1980 and the development policy since 1980; The importance of aid from rich countries.

Topic 5: (i) The policy role, challenges and opportunities of international migration; recent trends and the EU single labour market. (ii) Changing facets of international production; analysis and policy implications of outsourcing; trends in the patterns of offshoring and outsourcing.

Prerequisites: EC4102, EC4101
10. Fixed Exchange Rate Systems including the operation of fixed exchange rate systems; monetary adjustment mechanism; sterilisation; fixed exchange rate systems in the past; benefits and costs
11. European Monetary Union including economic benefits and costs to Ireland; adjusting to economic shocks
12. The European Central Bank. The design of the ECB; price stability; central bank independence; monetary policy in EMU.

Prerequisites: EC4102

EC4408 - PUBLIC FINANCE
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: This course covers the theory and practice of public finance. It examines the theoretical rationale for government intervention in modern increasingly globalised economies. More specifically it examines the theory and practice of the allocative, stabilisation and re-distributive roles of government. This involves analysis of theory and practice in relation taxation and expenditure decisions.

Syllabus: 1. Pareto Optimality, General Equilibrium, Social Welfare Functions,
3. Cost Benefit Analysis,
4. Taxation: Incidence and Partial Equilibrium, Taxes on Labour, Taxation and the incentive to work,
5. The Welfare State: Tax and Social Welfare Systems, Fiscal Measures to Reduce Poverty and Inequality,
6. Economics of Regulation.

Prerequisites: EC4101, EC4102, EC4004

EC4418 - MONETARY ECONOMICS AND INTERNATIONAL FINANCE
ECTS Credits: 6

Economics

Rationale and Purpose of the Module: The approach adopted in this module is to explain the main monetary theories and policies in the context of Ireland's membership of European Monetary Union and the operations and policies of the European Central Bank. Among the issues discussed are: economic adjustment to asymmetric shocks given the constraints of monetary union; the operations and policies of the European Central Bank; the transmission of monetary policy in the Eurozone; the determination of interest rates; exchange rate, interest rate, and fiscal policies in the Eurozone. In addition, a number of topics in international finance are examined including the various hedging techniques developed to minimize exchange rate and interest rate risk.

Syllabus: 1) The Design of the European Central Bank;
2) The ECB's Monetary Policy;
3) Project: An Introduction to Time Series Analysis;
4) The ECB and Interest Rate Policy;
5) Managing Interest Rate Exposure;
6) 'One Monetary Policy Fits All';
7) Open Economy Monetary Model;
8) Controlling the Money Supply;
9) The ECB and the Stability Pact;
10) ECB and Exchange Rate Policy;
11) Managing Exchange Rate Exposure;
12) Conduct of Monetary Policy be World's Major Central Banks.

Prerequisites: EC4102, EC4004

ED5502 - DIGITAL SYSTEMS 4
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Introduces the concepts and design issues for interfacing digital hardware to a microprocessor. This involves bus cycle timing, memory and I/O interfaces (serial and parallel) and interrupt architectures.


Prerequisites: ED5501

EE4008 - AVIONICS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: * To make the students aware of the principles of operation of avionic systems and the application of telecommunications and control techniques to aeronautics.
* To introduce the students to the principles of radar, radio navigation and telecommunications systems.
**Syllabus:** Principle of operation of avionic systems

Brief description of instrumentation, sensors, actuators, computer based data acquisition and control systems.

Introduction to navigational, communications and air traffic control systems.

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**Air Data Systems**

*Inputs:* pressure, air temperature.  *Outputs:* pressure altitude, air speed, mach number, air density, temp, etc.

*Air data instruments:* altimeter, airspeed indicator, vertical speed indicator, mach metre, etc.

**Compass Systems**

Gyroscope Instruments, mechanical gyro, gimbaled gyro, strap down gyro.

**Laser Gyros**

Sagnac effect

**Inertial Navigation Systems**

Flight control systems

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**Navigation Theory and Systems**

Navigation aids for aircraft

**Radio Navigation and Telecommunications Systems**

Loran C, Very High Frequency Omnidirectional Range (VOR), GPS, Automatic Direction Finder (ADF), Non Directional Beacons (NDB).

**Navigation sub systems**

Surveillance radar for Air Traffic Control.

**Navigation aids for aircraft**

MIL STD 1553, ARINC 429, A629

**Prerequisites:** EE4001, EE4004

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**EE4012 - CIRCUIT ANALYSIS 1**

ECTS Credits: 6

**Electronic & Computer Engineering**

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**EE4013 - COMPUTER NETWORKS**

ECTS Credits: 6

**Electronic & Computer Engineering**

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**EE4014 - ELECTRICAL ENERGY**

ECTS Credits: 6

**Electronic & Computer Engineering**

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**EE4018 - ENGINEERING MANAGEMENT**

ECTS Credits: 6

**Electronic & Computer Engineering**

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**Rationale and Purpose of the Module:**

This module is designed to provide students with a framework for comparing emerging distributed systems, as well as an understanding of the algorithms necessary to support a distributed system. Computing models and data communications will be studied, as well as software development issues relating to the development of distributed applications. Potential security threats in distributed systems will also be discussed.

**Syllabus:**

EE4024 - ELECTRICAL ENERGY (ELECTRICAL MACHINES)
ECTS Credits: 6

Electronic & Computer Engineering

Electronic & Computer Engineering
Rationale and Purpose of the Module: The main objective of this course is to provide an opportunity for students to gain a basic understanding of Communication Networks and Protocols.

Syllabus: Motivations and objectives of computer networks; overview of layered architecture and the ISO Reference Model; network functions, circuit-switching and packet-switching; physical level protocols; data link protocols including HDLC and multi-access link control. Network control, transport, and session protocols including routing flow control; end-to-end communication and inter-networking. Presentation layer protocols including web, virtual terminal and file transfer protocols, cryptography, network security. It also introduces some important merging technologies, such as, integrated voice and data networks (VOIP) and the integration of wireless and wired networks. Specific examples and standards will be cited throughout the course.

Prerequisites: EE4101

EE4117 - ELECTROMAGNETICS 1
ECTS Credits: 6

Electronic & Computer Engineering
Rationale and Purpose of the Module: This module is a 3rd year core module for BE in Electronic Engineering (LM070).

Transmission lines - Transverse electromagnetic waves along a parallel-plate transmission line, transmission line equations, wave characteristics along infinite and finite lines, transmission lines as circuit elements, resistive and arbitrary terminations, the Smith chart, impedance matching.

EE4214 - CONTROL 1
ECTS Credits: 6
Electronic & Computer Engineering
Rationale and Purpose of the Module: The module introduces students to some basic control theory, Dynamic System Modelling, open- and closed-loop systems, signal flow graphs, time response of first and second order systems. This module also gives students a basic introduction (from the control perspective to support the control theory and dynamic systems modelling) to some of the basic devices used in control, including actuators, sensors and transducers.

Syllabus: Dynamic System Modelling: Laplace Transform method, open and closed loop systems, signal flow graphs, transfer functions, time response of first and second order systems. Laboratory Work: Modelling and simulation of dynamic systems using Matlab Simulink and LabVIEW. Basic laboratory exercises, including data acquisition from sensors.

EE4218 - CONTROL 2
ECTS Credits: 6
Electronic & Computer Engineering
Rationale and Purpose of the Module: To further develop analysis and design skills in Automatic Control Theory. This module introduces students to a wide range of control design methods, covering both theoretical and practical aspects of control system design.

Syllabus: LINEAR SYSTEM ANALYSIS: Bode, Nyquist, and root locus, transfer function of plant with delay and non-minimum phase systems. Stability and Performance analysis using Bode diagrams, Nichols charts and Root Locus. Lead and lag compensation, the application of these using op-amps as an example, internal compensators. Introduction to Modern Control methods using State Space Techniques.

EE4313
Electronic & Computer Engineering
Rationale and Purpose of the Module: This module introduces students to integrated circuit design, to the limitations that apply to chip-level components, and to IC design methods.

Syllabus: IC technologies and components: Processing methods. Semiconductor Junctions. Passive (R and C) components and their limitations. Integration of BJTs, JFETs and MOSFETs. Device characteristics.
Analogue bipolar design methods: mirrors, high-gain stages, output buffers.
Analogue CMOS design methods: mirrors, high-gain stages, output buffers.
Digital logic families, an overview.
Analogue building blocks: overview of op-amps, comparators and PLLs, CMOS and BiMOS technologies.
Review of some analogue ICs, bipolar and MOS.

Prerequisites: EE4316

EE4328 - POWER ELECTRONICS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module will give students (electronic, Robotic, Control and Energy students) an understanding of modern power electronics both at the device level and at the renewable energy generation and distribution level.

Syllabus: Introduction (examples of typical power conversion applications e.g. a complete computer power supply system block diagram/space craft system, importance of efficiency, comparison linear vs switching supplies, overview key components utilised in power conversion.)
Switch realisation: semiconductor switches; diodes, Power MOSFETs, Thyristors, GTOs, IGBTs, properties, circuit symbols, comparative characteristics and application areas, power losses in switches.
The ideal switch, ripple and switching frequency, conduction losses, switching losses.
Switch mode power conversion: basic concepts; role of inductors, capacitors and transformers.
Analytical treatment of converters in equilibrium (steady-state converter analysis).
Modelling and simulation of converter in steady state (SIMPILIS)
Overview conversion topologies (non-isolating buck, boost, buck-boost)
Three phase full wave uncontrolled rectifier with inductive loads: circuit diagram, waveforms, output voltage, input current, input harmonics.
Single phase full wave thyristor controller rectifier: circuit diagram, waveforms and calculations.
Inverters: main concepts, square wave inverters, Sine PWM inverters: circuit diagram, Circuit waveforms, Amplitude modulation index, Frequency modulation index.
Variable Speed Drive: Fixed frequency induction motor torque speed characteristic, V/F operation, torque speed capability with V/F drive, typical V/F drive circuit diagram.
Continuous v discontinuous conduction mode.
Converter dynamics and control (overview small signals models, example topology, transfer functions), key skill which can be applied broadly.
Energy storage and energy transfer components and magnetics (capacitive, inductive, uncoupled, coupled).
Modern rectifiers (topologies, harmonics)
High power resonant converters
HVAC / HVDC Power systems and conversion basic understanding.
Harmonics/Flicker/Reactive Power Control.
Modelling of power converters.
Low voltage ride-through (wind application)

EE4408 - ASICS 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module is a 4th year core module for BE in Electronic Engineering (LM070) students. This is a follow-on module from EE4407 (ASICS I) which dealt with digital IC design issues. This follow-on module deals with analogue and mixed-signal IC design with an emphasis on the practice of theory and the use of IC CAD (Integrated Circuit Computer Aided Design) tools (analogue and mixed-signal IC design entry, simulation and layout CAD).

This module deals with the areas of design MOS circuit concepts, operational amplifiers, D/A converters, A/D converters, testability, ESD topics, plus assembly and packaging.

Sheet resistance Rs and resistor design in CMOS. Area capacitances of layers and capacitor design in CMOS.
Choice of Layers.
Operational amplifier (op-amp) architectures, design parameters and transistor sizing. Trade-offs in design. Op-amp DC and AC operation.
Latch-up in circuits.
High-performance A/D converters.
Static electricity & product quality. ESD (ElectroStatic discharge).


Prerequisites: EE4407

EE4522 - DIGITAL SYSTEMS 1
ECTS Credits: 6

Electronic & Computer Engineering

EE4524 - DIGITAL SYSTEMS 3
ECTS Credits: 6

Electronic & Computer Engineering

EE4816 - SIGNALS AND SYSTEMS 1
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To introduce a
number of mathematical and computer aided tools for analysing signals and systems in the time and frequency domains. Thus, students will develop a sound knowledge and understanding of linear transform theory for signal processing, and apply it to correlation and filtering of signals, in analogue and digital domains.


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**EH4002 - CRITICAL PRACTICE 2 - RENAISSANCE LITERATURE**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** The purpose of this module is to further develop the introduction of foundational skills to students of English literature, following on from Critical Practice 1, with a focus on Renaissance literature.

**Syllabus:** This module introduces students to genre-based studies in poetry and drama, in this case, to significant ideas and key works from the English Renaissance. The period studied, from the Reformation to the Restoration, sees the introduction into England both of new philosophies, such as humanism, and new literary forms, such as the sonnet. Therefore, the module aims to place the literature in those cultural, social, and political contexts which inform and affect its interpretation, and, through an account of the poetic and dramatic developments of the period, to equip students with the skills to identify and critically analyse poetic forms and dramatic conventions.

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**EH4008 - BRITISH LITERATURE SINCE 1945**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module examines students to key elements of nineteenth century literatures in English with a specific focus on Victorian and Edwardian texts and contexts. Students will examine a range of literary texts produced in the period and relate them to the political, social and historical circumstances in which they were written.

**Syllabus:** Addressing developments in literary practice and form, we will focus initially on the rise of the novel, and will also consider changes in the nature of author and audience during the second half of the nineteenth century. Nineteenth century aesthetic, political and social contexts for the literature will be central to our work and a range of theoretical approaches will be tested in relation to these categories. As part of this endeavour, students taking the module will be asked to participate in a group-based research project.

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**EH4006 - VICTORIAN TEXTS AND CONTEXTS**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module aims to introduce students to key elements of nineteenth century literatures in English with a specific focus on Victorian and Edwardian texts and contexts. Students will examine a range of literary texts produced in the period and relate them to the political, social and historical circumstances in which they were written.

**Syllabus:** Addressing developments in literary practice and form, we will focus initially on the rise of the novel, and will also consider changes in the nature of author and audience during the second half of the nineteenth century. Nineteenth century aesthetic, political and social contexts for the literature will be central to our work and a range of theoretical approaches will be tested in relation to these categories. As part of this endeavour, students taking the module will be asked to participate in a group-based research project.

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**EH4012 - RESTORATION AND AUGUSTAN LITERATURE**  
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** The aim of this course is to provide students with a survey of English literature between the Restoration of the British monarchy in 1660 and the middle of the following century. The course aims to immerse students in the literary language of the time, and to contextualise the emergence of modern genres such as those of the novel and the journalistic essay - genres which reflect a rapidly developing print culture and a growing middle-class readership.

**Syllabus:** This module aims to provide students with a survey of the English literature of the period variously known as the Augustan Age, the long eighteenth century, and the Enlightenment in Britain and Ireland. Informing students of the various critical and historical methodologies which can be applied to later seventeenth and eighteenth-century writing, we will study changes in literary practice and form alongside changes in the nature of author and audience, paying close attention to the broad cultural transition in which the cynical, satirical, and sometimes highly sexualised literature of the Restoration period (1660–1700) yielded to the gentler pastoral sensibilities of the middle of the eighteenth century. Along the way we will study utopian, libertarian and feminist impulses at work in the literature and thought of the Restoration and Augustan periods; we will also place these works in their global context, appreciating that this literature was produced on the cusp of the first substantial phase of Britain’s imperial expansion. The social history, philosophy, and literary forms of the period will be examined through a close study of selected texts.

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**EH4016 - STATE OF THE UNION: AMERICAN LITERATURE SINCE 1890**  
ECTS Credits: 6

**School of Culture and Communication**
Rationale and Purpose of the Module: This module follows on chronologically from EH4145 American Literature, covering the period from the closing of the frontier to the present day. Through a selection of texts reflecting the diverse voices of the literature, students explore the physical, cultural and sociopolitical geographies of America. Reading accounts of the city and town, the urban and suburban, the road, the land, the reservation, or the South, students engage with questions of self and society, class and race, national identity, marginalisation, counterculturalism and globalisation, as expressed within differing literary movements.

Syllabus: This module covers American fiction, poetry and drama from 1890 to the present day, including works by, for example, Chopin, Chekhov, Wharton, Crane, Stein, Frost, Stevens, Pound, Eliot, O'Neill, Cummings, Fitzgerald, Faulkner, Hemingway, Welty, Williams, Salinger, Kerouac, Heller, O'Connor, Ginsberg, Plath, DeLillo, and Pynchon; African-American writing by Du Bois, Hurston, Hughes, Wright, Ellison, Baldwin, Morrison and Baraka; Asian-American writing by Mukherjee, Tan and Lahiri; Jewish-American writing by Singer, Malamud, Bellow, Miller, and Roth; Native American writing by Silko and Erdrich; literature after 9/11. In defining the themes and interpreting the literature of the period, attention is paid to political, social and cultural contexts (for example, the Great Depression, the World Wars, the Civil Rights Movement, the Vietnam War), to significant concepts and philosophies (for example, realism, naturalism, modernism, postmodernism), and to literary movements (for example, regional writing, the Lost Generation, the Harlem Renaissance, the Beat Generation).

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EH4026 - COLONIAL/PARTICOLONIAL LITERATURE IN ENGLISH
ECTS Credits: 6

Syllabus: This module will examine colonial discourse of the British Empire, through a series of colonial and postcolonial literary and theoretical readings. More specifically, we will review the fundamental dichotomies of colonial discourse - master/slave, center/margins, enlightenment/barbarism, authenticity/hybrity, secular modernity/religious conservatism, nation/nativism - and will proceed to read articles and novels from the end of the 19th century, as well as 20th century, from India, Africa and the Caribbean, that both address and attempt to reconfigure the colonial experience from a variety of perspectives.

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EH4036 - IRISH LITERATURE 1930 - 1990
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The module revises and updates a module (EH4126 – Imagined Spaces: Irish Cultural Texts) in ways which better reflect the broad range of faculty interests in twentieth-century Irish literature. It will introduce students to a range of Irish literary work and cultural movements in the period 1930-1990. This was a period in which literary censorship was a controversial topic, and the threat posed by literary radicals to the stability of the new state(s) widely debated. Taking this as a starting point, the module will encourage students to interrogate the ways in which Irish literary culture challenged state censorship, how it evolved over the century, and what the impact of literary writing has been on dominant social and cultural formations on the island. Attending to innovation in style, structure, and genre in the period, the module will concentrate on formal as well as cultural experimentation.

Syllabus: The module will introduce students to a range of twentieth-century Irish literary work, focusing on literary realism, avant garde experimentation, autobiography and memoir, radio writing, and film adaptation, to give just some examples. Topics covered may include urban/rural representations, the "Irish city" (which will include transnational examples), "the Troubles" in Irish culture, changing gender representations, sexualities, language questions, migration, and the representation of minority communities in the culture. While the main focus will be on literary material, the module will also consider the broadcast media and film work of some authors involved, such as Kate O’Brien and Sam Hanna Bell, to give two well-known examples.

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EH4038 - STUDY OF A MAJOR 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 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 author. Students will study the authors development from early efforts to mature output and will be able to analyze and discuss the authors overall impact on literary history. Students will be able to position the author historically and politically and will understand the authors role as a contributor to intellectual history. Students will be able to position the author in different theoretical and methodological frameworks and will be able to assess and interpret a wide range of the authors work.

Example One: Virginia Woolf

This module will trace the development of the modernist novelist Virginia Woolf from early work to mature output. Students will read most of her major fictions as well as a selection of her essays and autobiographical pieces. Students will study Woolf as a theorist and practitioner of modernist narrative form, as a woman writer deeply interested in questions of female creativity and a significant contributor to feminist literary theory, and as a figure increasingly relevant to studies of memory and trauma. Students will also consider Woolf as a cultural icon by considering her work in relation to recent films and novels that deploy her work and life.

**EH4125 - FEMINIST LITERARY THEORY**
**ECTS Credits: 6**

**School of Culture and Communication**

**Rationale and Purpose of the Module:** To introduce students to a range of writing by women and to demonstrate how understandings of literature are marked by gender. To explore critical views of the institution of literature and to produce models of the reading and writing processes from a feminist perspective.

**Syllabus:** This course will combine feminist theory and the analysis of literary texts. We will consider five main areas of feminist theory and criticism: the concept of a ‘feminine aesthetic’; the contribution of psychoanalytic theory to understandings of gender, identity and writing; the relationship between erasure/E, ethnicity and gender in literature; questions of ‘gender trouble’ and sexuality; and postmodern feminist perspectives as they apply to literary texts. Throughout the course, theoretical approaches will be tested in relation to a range of women’s writing. Primary texts will be drawn from English language traditions in the first instance, although writings from other language traditions may be included depending on staff expertise.

**EN4008 - TEACHER AS PROFESSIONAL**
**ECTS Credits: 6**

**School of Education**

**Rationale and Purpose of the Module:** Students will reflect on the collective meaning and purpose of education. Students will also synthesise the meaning of teacher professionalism and will deepen their analysis of their emergent identities as members of the teaching profession.

**Syllabus:** The historical context of teacher professionalism in Ireland; professionalism and professionalisation; models of professionalism; self-regulation; national policy impact on teacher professionalism e.g. Teaching Council Codes of Professional Conduct; professional accountability, competences; teacher professional development across the continuum (initial, induction, probation and continuous professional development); duty of care; teachers and personal, emotional and moral development; impact of international research and policy on teacher professionalism (OECD, PISA); social and personal education; holistic education and pastoral care; teacher agency; performativity; professional boundaries and partnership; external agencies; whole school context and child welfare.

**EH4126 - IMAGINED SPACES: IRISH CULTURAL TEXTS**
**ECTS Credits: 6**

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module will explore cultural production in 20th-21st century Ireland, and interrogate the ways in which Ireland is produced, or constructed, in cultural and ideological texts. The module will focus in particular on changing definitions of Ireland and Irishness in the culture (literary and media) of the recent past.

**Syllabus:** The course will introduce students to a range of 20th-21st century Irish fiction and media texts, and address related issues in literary and film theory. The module aims to deepen students understanding of contemporary Irish culture in the following ways:

1. By addressing the relationship between contemporary Irish literature/media and the tradition of Irish writing and cultural production;
2. By providing an overview of the Irish media context with both theoretical and practice-based approaches.

Key issues will include: the myth of the West, urban Ireland, the Troubles in Irish culture, changes in gender role, queer/deconstruction of language, in-migration and diaspora, Irelands Others (e.g. Traveller, minority ethnic, lesbian & gay, and transgender cultures).

**EN4016 - RESPONDING TO DIVERSITY IN EDUCATION**
**ECTS Credits: 6**

**School of Education**

**Rationale and Purpose of the Module:** Aim: To develop in students an awareness and understanding of diversity in society and its implications for their professional practice.

**Syllabus:** Recognising diversity within self and other; starting educational planning for the needs of the learner; understanding the range of types of student diversity which are found in Irish schools (ability/disability and specific learning difficulties; gender; sexual orientation; social class; ethnicity/culture and membership of the Traveller community; first language) and its implications for planning and for practice; Policy and legal dimensions of such diversity; Student-centred, active and participatory learning approaches such as problem-based learning, debates, values clarification.
processes, the use of digital media and ICT in enhancing and supporting learning, photo and image work, ranking exercises, simulations, scenarios, role-playing, research projects (including discussion of surveys, focus groups, interviews and case studies), role of excursions and outdoor learning, and diverse workplace experience; management of non-traditional learning environments (students will have an experience in a non-traditional educational setting)

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EN4022 - EDUCATIONAL TECHNOLOGY FOR TEACHING AND LEARNING
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: This module introduces students to various forms of educational technology. The module provides participants with both the practical and pedagogical skills to integrate these technologies into their teaching. The module also provides students with relevant policy and professional issues related to ICT use in educational settings. A core focus of the module is to empower students to capitalise on the personal, social and educational benefits of the technologies whilst recognising the critical questions raised by an increasingly technological society.

Syllabus: Reconceptualising teaching and learning in the context of ICT; rationale for the integration of educational technologies in schools; national and international policy trends in educational technology; critical perspectives on educational technology; deconstructing the 'net generation'; critical media literacy; cyber bullying and child welfare issues; information security and legislative requirements; productivity tools for teachers; teacher and student generated content (wikis, podcasting, video content); technologies in the classroom; assistive technologies in education; Communication and collaborative learning technologies (LMS platforms in schools, Social media in education); ICT planning and leadership; use of ICT in supporting independent learning; Evidence-based uses of technologies in the classroom; emerging trends and technologies in education

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EN4026 - INCLUSIVE EDUCATION 2: SPECIAL EDUCATIONAL NEEDS
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: Successful inclusion of students with special educational needs is underpinned by positive teacher attitudes and a capacity to differentiate appropriately. This module aims to enhance students understanding of inclusion and to develop their capacity to identify and respond to students special educational needs collaboratively and within a whole school framework.

Syllabus: Knowledge of key national and international policy and legislative documents that pertain to special educational needs in Ireland; identification and assessment of need across cognitive, physical and emotional/behavioural domains; effective writing of individual education plans; knowledge and application of evidence based strategies in the area of SEN; understanding and support of SEN within a whole-school framework; collaboration with key stakeholders (e.g. parents/students) and a multi-agency approach to the inclusion of young people with SEN; experience of an alternative educational experience.

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EN4032 - UNDERSTANDING YOUNG PEOPLE AND HOW THEY LEARN
ECTS Credits: 6

School of Education

Rationale and Purpose of the Module: The purpose of this module is to introduce students to key concepts in developmental psychology and how young people learn. The module will provide students with a critical understanding of key learning theories, examining behavioural, cognitive and constructivist theories from both a historical and contemporary perspective. Students will gain a critical understanding of relevant aspects of adolescent development and their applications to teaching, learning and assessment.

Syllabus: Seminal and contemporary learning theories including behavioural, cognitive constructivist and bio-ecological accounts of learning; Adolescent Development (physical, cognitive, social/emotional); Factors to be considered in understanding student learning: personality, intelligence, attention, memory, thinking and problem solving, language and literacy development, metacognition; attributions; motivation

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EP4003 - ENTREPRENEURSHIP AND INNOVATION
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: The aim of the module is to help students to develop an entrepreneurial mindset that includes creativity, innovation and diagnostic abilities. The course focuses on entrepreneurship and innovation for new start-up businesses as well as entrepreneurial behaviour within larger organisations. Key objectives are to introduce students to the theory and practice of entrepreneurial creativity and innovation and to provide an understanding of the nature of entrepreneurship, the characteristics of the entrepreneur, the intrapreneur and the role of the socio-cultural and economic environment in fashionable innovative entrepreneurship. In addition the module examines the process of managing innovation.

Syllabus: This module commences with an introduction to the nature and development of entrepreneurship and emphasises the strong link between entrepreneurship and innovation. This leads to an overview of the schools of thought on entrepreneurship and an understanding of the entrepreneur and the entrepreneurial process. Creativity and innovation are examined with contextual emphasis on innovation in products, services and processes; product strategy, and new product/service development. Corporate entrepreneurship is explored and creative thinking is applied to identify venture opportunities, business planning, networking and technology transfer.

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EP4408 - SMALL BUSINESS CONSULTING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: The aim of the module is to provide participants with an understanding of both the business planning and consultancy process. Students will act as consultants for existing SMEs. In undertaking the consultancy project, students benefit enormously from this experience as they have the opportunity to apply experiential knowledge and concepts learned in the classroom to real-life business situations.

Syllabus: Knowledge is structured in two main sections, Theory and Application of Consultancy. Initially major consulting concepts and models are imparted, following
which students work together in groups engaging in experiential learning acting as consultants for an external SME.

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**EQ4014 - FOUNDATIONS OF EQUINE PERFORMANCE**  
**ECTS Credits:** 6  
**Biological Sciences**  
Horse handling and management; methods of control and restraint, protocols for assessing and monitoring horse health, welfare status and fitness for use, use of lungeing on hard and soft surfaces and as an evaluation tool for lameness and respiratory assessment. Measuring physiological indicators; respiration, temperature, heart rate, hydration. Assessment and selection for performance; genotypic and phenotypic considerations, environmental and training contributions, cloning the sports horse, sales evaluation. Training; identification of efficient athletic technique, exercises to improve athletic performance, improving accuracy and power in athletic technique in the horse, use of jumping exercises to improve power and agility, establishing independent balance in the horse and rider.

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**EQ4032 - EQUESTRIAN SKILL ANALYSIS**  
**ECTS Credits:** 6  
**Biological Sciences**  
**Rationale and Purpose of the Module:** This module provides important foundation skills for students of equitation in movement and technique analysis, necessary for evaluating equines as athletes. Students are provided with the knowledge and skills to evaluate the physical interactions between the horse and rider.  
**Syllabus:** Common misconceptions in rider skill requirements. Rider movement; the role of nervous, skeletal and muscular systems in proprioception and movement, use of body segments for balance and to influence the horse, core stability, skill related components of fitness, physiology and psychology of motor learning, limiting factors - joint range of movement, mental fitness and physical fitness. Qualitative analysis of rider movement, variations by sports discipline. Analysis of technique, strategies and rules of the 3 main Olympic equestrian disciplines and horse racing. Use of video analysis of, and feedback on rider performance. Analysis of efficient technique and its role in influencing the horse and avoiding injury. Simple methods for developing rider and horse skills; use of simple off and on horse techniques on the flat, over ground poles and jumping to promote efficiency, rhythm, balance, coordination and accuracy in rider and horse movement. Developing skills and knowledge on bandaging, bitting, early handling of horses and corrective and surgical shoeing. Factors affecting rider movement; tack and equipment, horse and rider conformation, rider gender, length of stirrup and saddle design.

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**ER4404 - MANAGING THE ENVIRONMENT**  
**ECTS Credits:** 6  
**Chemical Sciences**  
**Rationale and Purpose of the Module:** To introduce the student to the key areas of environmental management, integrated pollution prevention control and health & safety systems in the workplace.  
**To develop the students' understanding of the inter-relationship of these areas and their usefulness as tools for managing environmental and occupational safety performance within a company.**

**Syllabus:** [Health & Safety Legislation] [Integrated Pollution Prevention Control & Licensing] [Noise] [Chemical Agents, Biological Agents, Signs Regulations] [Employer, employee, safety officer, safety committee, safety representatives, roles & function] [The Safety Statement] [Safety policy & resources, hazards, hazard control, document control] [Hazards & Risk Assessment] Probability, consequence, injury, quantitative risk assessment [Hazards, Hazardous Substances & Health Effects] [Classification of hazards and hazardous substances, occupational exposure, routes of exposure, pharmacokinetic pathway, classification of toxic action and effect, carcinogens, non-carcinogens] [Integrated Pollution Prevention Control & Licensing] [Environmental Protection Agency - IPPC Legislation - BAT principles - Licence Application Requirements] [Monitoring Requirements] [Introduction to Environmental Management Systems] [Environmental Management Systems - principles, benefits, ISO14000, implementation methodologies].

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**ER4408 - ENVIRONMENTAL MANAGEMENT 2**  
**ECTS Credits:** 6  
**Chemical Sciences**  
**Rationale and Purpose of the Module:** This module provides a synthesis of contemporary developments in environmental management designed to equip students with an understanding of the context in which knowledge and skills developed in other modules interfaces with environmental policy development at scales from global to local. It is therefore both a broadening of their academic understanding and a vocation-orientated roadmap.  
**Syllabus:** Contemporary attitudes to the environment; sustainability definitions and metrics; environmental management at international scale: impact of globalisation (World Bank, NGOs, WTO), United Nations protocols (Montreal, Kyoto); European Union (EU) treaties, policy drivers and principles for sustainable development, evaluation of selected environment Directives, EU future policies; national level environmental management with special reference to Ireland; evaluation of available approaches and instruments; regional scale environmental management: the advantages, evaluation of industrial ecology principles and Local Agenda 21.

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**ER4508 - POLLUTION CONTROL 2 (WASTE MANAGEMENT)**  
**ECTS Credits:** 6  
**Chemical Sciences**  
**Rationale and Purpose of the Module:** To provide an understanding of current waste management options, their benefits and associated problems, and their place in the hierarchy of waste management.  
**To provide an understanding of the science and technology underlying solid waste management including the problems encountered.**

**To provide an understanding of the locational issues for...**
different types of waste processing plants, including the NIMBY Syndrome.

To provide an understanding of the technology of waste to energy systems.


**ER4606 - CLEAN TECHNOLOGY**

**ECTS Credits:** 6

**Chemical Sciences**

Rationale and Purpose of the Module: To provide an introduction to the concept of clean technology. To survey methods of recycling, reducing or removing gaseous or aqueous waste from industrial processes using a clean technology approach.

**Syllabus:** Introduction to clean technology. Examples of Clean Technology in the agricultural industry, agrochemical, fine chemical and pharmaceutical industry. Role of catalysts, reactor configuration and design, Elimination of emissions from material handling and storage, Control of fugitive emissions, Use of biotechnology.

**ET4004 - TCP / IP NETWORKING**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: The aim of this module is to provide a detailed study of the TCP/IP model and the internet. The module also covers advanced topics in multimedia communications.

**Syllabus:** The internet and TCP/IP model: Evolution of internet; TCP/IP model (layers description and functions, PDU encapsulation, protocol architecture); TCP/IP internetworking principles. Network layer: Internet protocol (IP) mobile IP, addressing (IPv4 vs. IPv6); NAT operation (static vs. dynamic); subnetting and supernetting; address resolution with ARP and RARP; routing protocols (RIP, OSPF, BGP), Quality of Service (DiffServ vs. IntServ); control and assistance mechanisms (ICMP); internet multicasting (MBone operation) and group management (IGMP)

Transport layer: Unreliable datagram transport with UDP; real-time transport with RTP and RTCP; reliable connection-oriented transport with TCP and SCTP; wireless TCP. Application layer: Review of client-server model; domain name system (DNS); TCP/IP configuration; static (BOOTP) vs. dynamic (DHCP); terminal networking with Telnet; file transfer with FTP and TFTP; email service (SMTP, POP, IMAP); browsing with HTTP; network management with SNMP. Multimedia communications; streaming audio, internet radio, VoIP (SIP v H323), video on demand, IPTV.

**ET4006 - ELECTRONICS (ED)**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: To provide the students with the knowledge and skills required to specify and manage classroom based projects using analogue and digital electronic devices and equipment available in schools. To develop the knowledge, skills, values and attitudes appropriate to the teaching of technologies.

**Syllabus:** Transistor switch and operational amplifier circuits (op-amps) with output devices lamp, buzzer, LED, speaker, motor, relay. Operational amplifier circuits (op-amps) assembled as comparator, amplifier, and oscillator. Simple timing circuits.Logic Circuits, basic logic gates AND, OR and NOT NAND, truth tables for each. The main logic families (TTL and CMOS). The use of logic gates with sensors and output devices. Inputs and Outputs, buffers (transistors, amplifiers, paralleled outputs), Schmitt trigger. Binary inputs. Counters, clock circuits, de-bouncers, counters, seven segment displays and display drivers. Circuit Design and Assembly of Pre-designed Circuits. Printed circuit boards (PCBs) Use of prototyping boards for initial assembly and testing of circuits. Strategies for teaching this subject area at second level. Designing, planning and managing appropriate teaching and learning activities for this subject area.

**ET4004 - DATA SECURITY**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: To introduce the concept of security services such as authentication, integrity and confidentiality. To introduce the role of digital signatures and their implementation using cryptographic ciphers. To introduce basic security protocols that provide security services. Attacks against security services: Replay attack, man in the middle attack.

**Syllabus:** [Introduction to Security Services:] Security attacks, OSI model, security services: concepts of confidentiality, data origin authentication, entity authentication, data-integrity, access control, availability. [Digital Signatures:] The role of signatures, MACs, Hash functions, digital signatures, public key certificates, X509 certification authorities, e-mail security: PGP. [Security Protocols:] Introduction to key management, peer-to-peer distribution protocols and identification protocols. Secure web (https/ssl), secure shell (ssh) etc. [Identification techniques:] Identification tokens and smart cards. Biometric identification: finger prints, retina scan, face recognition, voice recognition. [Attacks:] Definition of attacker and capabilities of attacker, introduction to attacks on protocols, such as replay attacks, man in the middle attack.

**ET4018 - MOBILE AND WIRELESS COMMUNICATIONS**

**ECTS Credits:** 6

**Electronic & Computer Engineering**

Rationale and Purpose of the Module: The aim of this module is to provide an introduction to mobile communications and mobile networking. At the completion of the module, students should have an understanding of the important issues in providing a mobile communications system including signal transmission, network management and interaction with a fixed network. Students should understand the principles of operation of a current mobile communications system and the potential for future services development.

**Syllabus:** Digital mobile and personal communications
systems: General configuration of cellular systems; comparison a with fixed communications systems; systems overview: Fixed wireless Access, cellular, WLAN, Wireless Personal Area Network (WPAN), satellite. Cellular Concepts: Frequency reuse; channel assignment; capacity; sectoring.
Review of wireless transmission; Signals, propagation issues, coding, modulation, multiplexing, spread spectrum.
Medium access control: SDMA, TDMA, FDMA, CDMA, WCDMA, effects of Multiple Access Interference and ISI.
Mobile telecommunication systems: GSM, GPRS, EDGE, UMTS, HSDPA, future generation (4G).
Key concepts in the dynamic management of resources; call control, switching, wireless access and channel allocation, handoff, roaming, HLR and VLR.
Wireless network issues: MAC, QoS, ad-hoc networks, MANET.
Example systems: Bluetooth, IEEE 802.11, Ultra-wideband (UWB).
Mobile IP, mobile TCP issues.
Support for mobility at higher communications layers.

DAOU

ET4027 - COMPUTER FORENSICS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module aims to give the student a firm understanding of the problems associated with computer forensics in relation to data recovery from digital media, whether the data was accidentally lost or deliberately destroyed.
The student will learn to extract information from a computer which might be of relevance at a crime-scene using a variety of forensic techniques, tools and commands.

File systems: Disk technologies; Data organisation; File systems on Unix and Windows.
Data recovery: Recovering data and analysing data usage patterns: the Audit Trail; Use of caches, spooling, paging files, logs, backup media, computer memory (while still powered).
Tools for forensic analysis: Laboratory/project based: file system analysis tools; investigate a case study forensic problem; emphasis on the use of tools.

ET4028 - HOST AND NETWORK SECURITY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: Gain an in-depth knowledge of host and network security. Assess the security of a network. Recommend and implement measures to prevent security threats.
Research and develop security audits. Conversant in current trends and methodologies.

[Fireswalls] Packet filters, stateful firewalls, proxy firewalls. DMZ concept, layout and design.
[Auditing and Intrusion Detection] Audit trail features, user profiling, intruder profiling, signature analysis, network IDS, host IDS, distributed IDS, combining firewalls and IDS.

ET4038 - MOBILE AND WIRELESS JAVA
ECTS Credits: 6

Electronic & Computer Engineering

Mobile Service Architecture.
Security and Administration issues relating to networks of Java ME compliant systems, including the following services: Security and Trust; Location; Content Handlers; Scalable Vector Graphics and Advanced Media; Payment; Internationalisation.
Java APIs for Bluetooth.

ET4088 - ENERGY MANAGEMENT AND TECHNOLOGY
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module provides the necessary understanding, knowledge and skills for students to undertake a career in Energy Management.
This module will be a direct replacement for ET4048 /ET4068 Electronic Systems for the Built Environment 2 on LM080 and LM087.


ET4122 - ANALOGUE ELECTRONICS 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: The aim of this module is to continue the introduction and analysis of the principles of operation of electronic devices and circuits using the principles introduced in 0Analogue Electronics 16. A more in-depth analysis will be undertaken using suitable analysis techniques. At the end of this module students should be able to solve problems concerning simple DC circuit theorems and analyse AC circuits using...
both the phasor approach and the complex notation approach.


**Prerequisites:** ET4141

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**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** Introduce students to the architecture of modern computers and processors.

**Syllabus:** Use of a microprocessor in a computer; relationship between hardware, software and operating system; Microprocessor concepts: von Neumann computer, block diagram of a microprocessor, fetch-decode-execute cycle. Memory, I/O and microprocessor in a computer, read/write cycles. ProgrammerÆs model of a simple microprocessor, using a simplified 8086 as an example. Registers, addressing modes (simplified) and instruction set of an 8086, including unconditional and conditional jump and branch instructions, status bits, the stack and subroutines. Evolution of Pentium from 8086; Example of an embedded system and comparison with a PC û similarities and differences. Introduction to the PC, its bus structure and relevance of the BIOS. Project Work: Writing simple assembly and C programs and verifying their operation; Exploration of PC using æMy ComputerÆ and other PC-based tools. Application of transducer, amplifier and ADC. Overall concepts of accuracy, drift, resolution, and common mode rejection applied to a measurement system, complete system composed of a transducer, amplifier and ADC.

**Prerequisites:** EE4102, EE4313, EE4101

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**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.

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**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module will introduce the students to the concepts of database design, management and applications, such that they will gain a working knowledge of how to design and build a database and database-driven web sites that meet given business requirements, using industry standard database management systems.

**Syllabus:** * Data models & database architectures * Database Management System (DBMS): typical functions/services and major components * The relational database model: introduction & additional concepts * Database design methodology: conceptual, logical and physical database design phases * Introduction to Structured Query Language (SQL): Data manipulation and Data definition * Approaches for integrating databases into the web environment; client-server architectures * Introduction to Microsoft Web Solution Platform: Active Server Pages (ASP) and ActiveX Data Objects (ADO); Introduction to scripting languages * Web database programming case study

**Prerequisites:** ET4132

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**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to fundamental principles of sensors and actuators. * Measurement of physical phenomena utilising various sensing techniques. * Transducer action and signal conversion * Various Actuator types and principles of operation. * Specification of a complete measurement system.

**Prerequisites:** ET4151

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**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to fundamental principles of sensors and actuators. * Measurement of physical phenomena utilising various sensing techniques. * Transducer action and signal conversion * Various Actuator types and principles of operation. * Specification of a complete measurement system.

**Prerequisites:** ET4151

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**ECTS Credits:** 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to fundamental principles of sensors and actuators. * Measurement of physical phenomena utilising various sensing techniques. * Transducer action and signal conversion * Various Actuator types and principles of operation. * Specification of a complete measurement system.

**Prerequisites:** ET4151
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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**EV4013 - EQUINE PHYSIOLOGY**

**ECTS Credits: 6**

**Biological Sciences**

Rationale and Purpose of the Module: This module builds on the previous modules BY4001, BY4002, BC4902 and EV4012 and forms a core module on the Equine Science Degree programme.

Syllabus: Integrating the students prior knowledge, and valuing a quantitative approach, this module leads to an advanced understanding of mammalian body systems, exemplified by equine performance and dysfunction. The systems to be studied include: Blood circulation and the cardiovascular system. Respiration. Water balance and excretion including renal function and urine formation. Gastrointestinal function.


Prerequisites: BY4002, EV4012, BC4902, BY4001

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**EV4014 - EQUINE NUTRITION**

**ECTS Credits: 6**

**Biological Sciences**

Rationale and Purpose of the Module: The purpose of this module is to provide students with an understanding of the scientific principles of Equine Nutrition and how these relate to the practical applications of feeding.

Syllabus: Classification, digestion, absorption and metabolism of carbohydrates, protein and lipids; Amylose and amylopectin; Utilisation of the products of dietary energy and protein; Glycemic response, insulin production, insulin resistance and hyperinsulinaemia; microbial fermentation, manipulation of fermentation; VFA absorption; VFA efficiency, lactic acid production, Feed digestibility including aspects on apparent and true digestibility; Transit and retention times, Protein degradation and amino acid absorption; NPN and N utilisation, FFAs; Water; water requirements; Appetite; Feeding standards, Metabolic body size and intake; Feed energy systems, Partition of dietary energy for horses, an evaluation DE and NE systems; energy and protein requirements based on UFC and MADC; heat increment; Efficiency of utilisation of ME; A critical review and evaluation of feeding experiments, and nutrient balance studies; Dietary electrolyte balance; Feeding for performance and metabolism of nutrients during exercise, Applied equine nutrition including aspects on nutrient requirements and utilisation during periods of for growth and production (lactation, gestation). An overview of dietary related problems; Application of current equine nutritional research;

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**EV4015 - EQUINE HEALTH AND DISEASE**

**ECTS Credits: 6**

**Biological Sciences**

Rationale and Purpose of the Module: To acquaint students with the physical appearance and behaviour of the healthy horse so that signs of ill health and disease are recognised at an early stage, thus enabling them to make informed decisions about the necessity for veterinary intervention. To acquaint students with disease conditions of toxicologic origin and with the causes, management and prevention of infectious diseases.

Syllabus: To acquaint students with the physical appearance and behaviour of the healthy horse so that signs of ill health and disease are recognised at an early stage, thus enabling them to make informed decisions about the necessity for veterinary intervention. To acquaint students with disease conditions of toxicologic origin and with the causes, management and prevention of infectious diseases. Topics covered include parasitic, bacterial and viral diseases of the horse. Diseases of metabolic and degenerative origin are also discussed, including degenerative orthopaedic diseases and osteoarthritis. Disease conditions of the airways and their impact on athletic performance of the horse are discussed from the perspectives of contributing environmental factors and prevention.

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**EV4017 - EQUINE PHARMACOLOGY**

**ECTS Credits: 6**

**Biological Sciences**

Rationale and Purpose of the Module: To acquaint students with the classes of drugs which are of relevance to equine medicine and to provide an insight to the factors that determine species differences in drug response.

Syllabus: To acquaint students with the classes of drugs which are of relevance to equine medicine and to provide an insight to the factors that determine species differences in drug response. Classification of drugs and sources of information on drugs. Drug dosage forms and routes of administration. Processes of drug absorption, distribution, metabolism and excretion. Basic principles of pharmacokinetics. Pharmacological effects, mechanism of action and fate of therapeutic agents that affect various systems of the body (equine), with particular emphasis on drugs affecting the musculo-skeletal and respiratory systems; Antimicrobial drugs; Non-steroidal anti-inflammatory drugs; Anthelmintic medication; Applied toxicology; Drug assay methodology; Drug licensing, registration and
Racecourse management. Aspects of breeding and industries; horse feed industry, transportation, tourism. Control and administer the horse industry. Ancilla statutory and regulatory organisations that operate, legislation. Horse welfare; issues and legislation. The Safety, health and welfare within the horse industry; organisat...importance, policies, supports, regulations, Australia; comparative analysis of nature, size, economic Industry, The Horse Industry in Europe, US and related to: The Irish Horse Industry, the UK Horse Syllabus:

Rationale and Purpose of the Module: The purpose of this module is to provide students with an understanding of the scientific principles of Equine Reproduction and how these relate to the practical applications of equine breeding.

Syllabus: The syllabus is comprised of the following: reproductive anatomy of the mare and stallion, reproductive endocrinology of the mare and stallion, oestrous cycle, fertilization, pregnancy, parturition; neonatal physiology; male reproductive physiology and practical aspects of equine breeding management. The management of brood mares and stallions are presented from a physiological and husbandry perspective. The events at parturition are presented and discussed in the context of the management of the neonatal foal and the early return of the mare to reproductive activity.

FI4008 - EMPIRICAL FINANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The course provides students with a thorough grounding in the empirical study of international financial markets to prepare them for potential careers as traders, risk-managers, quantitative analysts, stockbrokers, fund managers, etc in the financial services industry. The learning experience is enhanced through the learning-by-doing experiences of course participants through a mix of computer workshop-oriented tutorials and labs, and interactive web-based simulations.


FR4142 - FRENCH LANGUAGE AND SOCIETY 2: INTRODUCTION TO FRE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (i) To review key aspects of contemporary Francophone societies; (ii) to continue to develop students receptive and active language skills; (iii) to consolidate students knowledge of French grammar; (iv) to reinforce students awareness of issues related to the evolution of the French language and in particular regional varieties and la Francophonie; (v) to promote students reading and analytical skills in the study of French literature.

Syllabus: Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of France and francophone societies. Themes presented this semester are (i) decolonisation and the variety of francophone communities; (ii) the search for identity in modern literature; (iii) la Francophonie and regional varieties of language. Tutorials explore these subjects and students reading and writing skills are improved through regular exercises. Particular attention is paid to oral and aural skills in French which are developed through the discussion of a broad selection of contemporary oral and written texts from diverse media. Students continue to review issues related to French grammar.

Prerequisites: FR4141

FR4146 - FRENCH LANGUAGE AND SOCIETY 4 MODERN CONTEMPORARY
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module is an introduction to contemporary social, economic and
political life in France. This is achieved: by developing students’ knowledge of French culture and society by focusing on the country’s cultural, social and political aspects by encouraging team-work and intercultural understanding.

Syllabus: The module provides students with a platform to broaden and advance their experience of language learning. Language and culture are interwoven through the four distinct parts of the module. In the lectures, students are introduced to analytic tools to study particular social political and cultures aspects. In the tutorials, analysis work of newspaper articles is undertaken making students aware of the vital link between culture and language learning. In short, The module is centred on a series of lectures analysing the major issues in French politics, economics and society from 1945 to the present. Language tutorials review some of the points raised in the lectures through close reading and discussion of authentic texts related to the lectures. Language tutorials also endeavour to develop written skills in the French language through translation and/ or essay writing. Tutorial are also devoted to the study of a literary text closely related to the subject matter.

Prerequisites: FR4143

FR4242 - FRENCH LANGUAGE, CULTURE AND SOCIETY 2A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims:
- To improve oral and written language skills through activities such as textual analysis, translation, essay writing, oral presentations, discussion and debate;
- To provide an in-depth study of aspects of post-war France in political, social and economic contexts;
- To enable students to understand the ideological and cultural background to modern France through a reading of selected eighteenth-century texts;
- To practice translation from and into French of texts relating to post-war France, and to become familiar with the theories relevant to the translation of such texts and the strategies available to the translator when translating them.

Syllabus: Development of active and receptive language skills, both written and oral; key moments in the history of post-war France; revolutionary ideals in eighteenth-century France; introduction to the theory and practice of translation, focusing on the area of post-war France.

Prerequisites: FR4243

FR4248 - FRENCH LANGUAGE CULTURE AND SOCIETY 6
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The purpose of this module is: (i) to give students an overview of the French media industries and the ability to evaluate their functions. This is achieved by:
- the study of the relationship between the media and the state
- in depth analysis of different branches of the media
- practice in using the language of the media and in analysis particular media artefacts.

Syllabus: This module has three parts, each dedicated to particular aim of the module.

A general lecture will cover topics on the role of the media, the role of the state, the particularity of the French press, the development of French cinema from its beginnings to the present day. There will be a translation class and a two hour seminar in which three films will be studied as set texts and in which students will be prepared for their final oral examination.

Prerequisites: FR4147

FR4246 - FRENCH LANGUAGE CULTURE AND SOCIETY 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The purpose of this module is: (i) Communication and the media in France - the study of the relationship between the media and the
state; analysis of different branches of the media; practice in using the language of the media and in analysing particular media artefacts. (ii) Work on video documents on current issues in francophone countries to improve comprehension and oral skills. (iii) Translation of journalistic texts from French to English in the light of translation theory in order to foster the development of transferable translation strategies. (iv) Principles and practice in bi-lateral interpreting.

Prerequisites: FR4247

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FR4622 - LITERATURE AND CULTURE 2: TWENTIETH-CENTURY LITERATURE IN FRANCE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop students' knowledge of twentieth-century literature from a variety of critical perspectives.

To enable students to apply critical skills to the study of recent literature in French.

To develop students' skills in communicating ideas in oral and written French.

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

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FR4628 - FRENCH LITERATURE AND CULTURE 6: MODERNITY AND GENRE; THE NOVEL IN FRENCH
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module offers a thorough discussion of the question of literary genre and cultural modernity û with particular reference to the novel genre in French over a period of four centuries. In so doing, it builds upon the pre-existing knowledge of students who have been exposed to a number of examples of the genre in preceding modules, while synthesising across the historical scope of their prior exposure to French literary and cultural artefacts. It consolidates the linguistic work done in earlier modules through a challenging exposure to works of a certain difficulty and length, deepening students' practices of both reading and responding to major cultural artefacts in the target (French) language.

Syllabus: The module seeks to foster a sense of the long-term in cultural and literary developments. Hence the inclusion of texts spanning four centuries (17th, 18th, 19th and 20th). Elements of context will be provided, through the inclusion of reference to wider historical development, social and cultural theory, and to the parallel and related development of other literary genres. Secondary reading will be duly circumscribed with emphasis being placed on thorough and close readings of the individual works. This emphasis will be replicated in the forms of assessment adopted. Students will be required to give an analytical presentation in the target language of an agreed extract (close reading and linguistic skills). Assessment will also include an extended synthetic essay in the target language (argumentational and linguistic skills).

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FR4922 - FRENCH FOR BUSINESS 2A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: (i) To consolidate and expand students Business French acquired in Semester one; (ii) to provide students with an understanding of key aspects of contemporary Francophone societies; (iii) to further develop practical language skills (receptive and active); (iv) to develop students appreciation of French literature; (v) to extend students knowledge of French grammar

Syllabus: Students are introduced to the detailed study of social, historical, linguistic and literary aspects of France and la Francophonie. Themes presented this semester are (i) decolonisation and the variety of francophone communities; (ii) the search for identity in modern literature and (iii) la Francophonie and regional varieties of language. Oral and aural skills in French are further improved through the discussion of a broad selection of contemporary oral and written texts from diverse media. With the use of authentic material (both written and oral) and with a variety of linguistic activities simulating a business environment students are asked to deal competently with tasks encountered in specific situations. The areas of focus include: finance, accounts, and investments. Students also study a literary text related to one of the lecture themes. The study of French grammar ûin semester 1- is continued.

Prerequisites: FR4921

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FR4924 - FRENCH FOR BUSINESS 4A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To extend within a French business context students' reading, speaking, writing and listening skills already practised in the previous terms of university study. This is achieved: by revising and increasing students' knowledge of French vocabulary and grammar by familiarizing them with new aspects of French society
and culture by introducing students to Business French relevant to their future professional needs.

**Syllabus:** The French for Business 4 module provides students with the space to expand their knowledge and language skills. Using authentic material, students are asked to perform in a simulated business environment a variety of tasks encountered in specific situations - Focus area: Corporate culture (workers and their workplace, internal communication, time management). In addition students make short oral presentations in the target language on selected French social/ cultural issues. Students also study a literary text related to the area of study currently "Les mains sales" by Jean-Paul Sartre.

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**FR4928 - FRENCH FOR BUSINESS 8A**  
**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** While building on previously acquired reading, speaking, writing and listening skills, the course aims to enhance students' ability to engage with and express effectively ideas and concepts through the means of the target language relating to contemporary French society and issues.  
- by working with authentic documents (press articles, one literary text, websites)  
- by providing students with opportunities to practice their oral and written skills  
- by encouraging intercultural understanding via tandem learning with French students

**Syllabus:** The French for Business 8 module provides students with a language rich environment to further their knowledge and increase their confidence. In the lecture, students gain an insight into contemporary French society. The political situation and recent cultural, economic and social developments in France are examined. In the tutorials, students conduct research and complete a task based Internet project on a French city (a city that they know from their Erasmus/Coop placement experience - identifying and analysing a number of political, economic, social, or cultural issues. Finally, students study a literary text related to the module title, currently, ÓJour du dehorsó by Annie Ernaux.

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**Prerequisites:** FR4927

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**FT4204 - FOOD CHEMISTRY**  
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To introduce students to the utilisation of raw materials by the food industry  
To provide a general course on the chemistry of raw materials and of foods


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**FT4214 - PUBLIC HEALTH NUTRITION**  
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** This module provides the necessary understanding, knowledge and skills to allow students undertake more advanced learning in nutrition in subsequent semesters. Public Health Nutrition will focus on population-based epidemiological evidence linking diet and disease and explore interactions between nutrition, genetics and lifestyle. Specific topics of issue to public health including obesity, type II diabetes, heart disease, specific micronutrient deficiencies, dental health, osteoporosis, cancer and immunity will be discussed. The role of national and international regulatory agencies (including the World Health Organisation, Food Safety Authority of Ireland, Food Safety Promotion Board, European Food Safety Agency) will be examined in terms of safe guarding population public health. The purpose of this module is to: a). To provide an overview of the role of nutrition as a major factor in the aetiology of chronic disease of relevance to public health b). To examine the role of diet in treatment and prevention of a range of chronic disease c). Explore a number of emerging diet-related public health issues. The most relevant and up-to-date literature will be used and referenced to provide the best evidence base for this module content.

**Prerequisites:** BY4214

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**FT4428 - ADVANCED FOOD CHEMISTRY**  
**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To provide an advanced course in Food Chemistry  
To develop a comprehensive understanding of the relationships between food characteristics and their molecular basis.

**Syllabus:** Detailed treatment of the chemistry of lipids, carbohydrates and proteins in food systems. Analytical techniques. Relationships between structure and function. Industrial modification of lipids; oxidative rancidity and its control. Emulsification. Non-enzymatic browning and caramelisation reactions. Natural and chemically modified polysaccharides. Roles of proteins in gelation, dough formation, foaming, texture formation, etc. Effects of processing and storage.

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**FT4438 - FOOD MICROBIOLOGY**
**Biological Sciences**

**Rationale and Purpose of the Module:** To provide a specialised course on the microbiology of foods.

**Syllabus:** Roles of major families of microorganisms in food preservation/spoilage, food fermentations and public health. Isolation and characterisation. Physiological characteristics of selected food microbes. Microbial testing and control in food products. Advanced detection methods. Hygiene, cleaning and disinfection in the food factory. HACCP and Quality Systems. Foodborne pathogens of current concern including Listeria monocytogenes, psychrophilic C. botulinum, Aeromonas, Yersinia, Bacillus cereus, Salmonella etc.

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**FT4458 - FOOD PRODUCTION SYSTEMS**

**ECTS Credits:** 3

**Biological Sciences**

**Rationale and Purpose of the Module:** To give students a general understanding of agricultural production in Ireland. To give students an appreciation of the factors influencing the production of novel crops and their subsequent utilisation.

**Syllabus:** [Soils and plant nutrition]; soil composition, physical chemical and biological properties. [Fertiliser use]. [Production of conventional and novel crops including crops for biomass use]. [Grassland and grazing], grazing systems, grass conservation. [Milk and meat production], rearing and management of cattle, sheep and pigs, production systems. [Effects of production methods on post-harvest and processing quality].

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**FT4468 - FOOD BIOTECHNOLOGY**

**ECTS Credits:** 6

**Biological Sciences**

**Rationale and Purpose of the Module:** To introduce students to the basic concepts of Food Biotechnology. To develop an understanding of the enabling technologies used to manipulate micro-organisms, plants and animals for the production of food. To develop a critical awareness of the impact of Food Biotechnology on the production and processing of food. To develop a critical awareness of the impact of Food Biotechnology on the ethics, labelling and regulatory issues related to the consumer and the environment

**Syllabus:** Introduction to Food Biotechnology, Outline of basis of traditional and novel food biotechnology processes; principles of fermentation, separations, recovery systems; Introduction to novel platform technologies; Genomics, Proteomics, Bioinformatics. Biotechnology and the food industry: Enzyme and bacterial mediated bio-transformations; Flavour Ingredients, Brewing, Winemaking, Enzyme technology. Food applications of microbial biotechnology; Lactic acid bacteria and Yeast; metabolic and protein engineering, overexpression of enzymes and metabolic end products; Probiotics and nutrigenetics. Plant Biotechnology; Plant transformations, genetic strategies for improvements of characteristics, pesticide resistance, yield improvement, metabolite production. Animal Biotechnology; Genetic strategies for improvements of animal characteristics, disease resistance, yield and performance improvement, Transgenic animals, Quantitative trait loci (QTLs) Related issues; Regulations and Legal declarations, Ethics, Consumer concerns, biotechnology and the environment, Future trends

**Prerequisites:** BC4904, BC4803

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**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

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**GA4116 - IRISH LANGUAGE 2**

**ECTS Credits:** 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** The course aims to build on the language skills acquired in module GA4115. It introduces students to the study of Irish placenames and surnames. 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. To foster autonomous language learning skills. To develop listening and speaking skills in Irish acquired in GA4115. To equip the student with basic writing skills.

**Syllabus:** Language element: This is a continuation course. Topics covered include: Matters of work, food and drink, sickness and injury, clothes and shopping, holidays and travel, orders and making arrangements. Gaeltacht regions and certain dialect features will be discussed and some of the many Irish-language materials and resources now 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's Common European Framework of Reference for Languages. Those who complete modules GA4115 and GA4116 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.

Lecture topics to be covered include: Placenames, an understanding of the factors involved in their creation,
the people who made them and the purposes they serve, the classification of placenames, bailt chiorp mar logainmneacha, pagan/Christian associations of placenames, toponyms of sea-side and island areas, case-study of the Aran Islands, the most common Irish surnames, the surnames of County Limerick, the influence of invasion on Irish surnames, how surnames evolved / changed, genealogical sources for tracing Irish ancestors, the genealogy market, some prominent Irish families e.g. the O'Malley's, Granuaile.

Rationale and Purpose of the Module:
School of Modern Languages and Applied Linguistics

Prerequisites: GA4115

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GA4228 - IRISH FOLKLORE II
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The purpose of the module is to provide the student with an introduction to research in Folklore and Ethnology in either Irish or English, taught on a one-to-one basis and by embarking on an extended research project.

Syllabus: The student will initiate a research project on a topic approved by a supervisor. The student will, by a specific date, submit a 500 word brief which will include a resume of the subject matter, the scope of the project, a review of sources and an outline of the methodology required. The student will start the collection of the necessary data.

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GE4128 - GERMAN LANGUAGE AND SOCIETY 2:
INTOD GERMAN STUD II
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To give an overview over major trends in German culture and society from 1945 to today by means of texts and visual material.

Tutorials: a) analysis of literary texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques, principles of textual analysis and text discussion in oral and written form; b) Contrastive grammar work continued. Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

Prerequisites: GE4141

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GE4146 - GERMAN LANGUAGE AND SOCIETY 4:
GERMANY PAST AND PRESENT
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To introduce further basic grammatical structures/functions and consolidate those covered in previous module.

Syllabus: Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe.

Tutorials: a) analysis of literary texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques, principles of textual analysis and text discussion in oral and written form; b) Contrastive grammar work continued. Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities.

Prerequisites: GE4147

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GE4212 - GERMAN FOR BEGINNERS 2 (APPLIED LANGUAGES)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims to:

To give an overview of major trends in German culture and society in the post-war period.

To consolidate and develop basic communicative skills acquired in GE4211.

To introduce further basic grammatical structures/functions and consolidate those covered in previous module.

Syllabus: Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and
literary trends; contemporary literature and culture in the German-speaking countries of Europe.

Tutorials: The course builds on GE4211, introducing further grammatical structures, functions and vocabulary. Development of all four language skills in the classroom and laboratories. Transfer of known structures to a variety of communicative contexts. Further guidance will be given to students on how best to develop self-study skills to reinforce material covered during the course. One tutorial provides an introduction to German drama and further short stories.

Language Laboratory: One hour per week will be spent in the computer laboratory, consolidating grammar and develop self-study skills to reinforce material covered in the course.

Prerequisites: GE4211

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GE4242 - GERMAN LANGUAGE, CULTURE AND SOCIETY 2A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To further develop student awareness of political structures and to provide an understanding of German-speaking countries as economic and industrial entities; to continue development and consolidation of communicative skills; to develop autonomous language learning methods. Continued emphasis 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: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe. Tutorial work: one hour textwork develops skills relating to textual analysis, grammar in use and writing, literary texts relating to lectures will also be discussed in this class and examined in the oral and written exams; one hour grammar/translation consolidates existing grammatical knowledge and introduces more complex structures through contrastive work using English/German translation exercises; German linguistics relates general linguistic course to the German situation, focusing on past and current developments in the German language.

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GE4246 - GERMAN LANGUAGE CULTURE AND SOCIETY 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop students' understanding of contemporary Germany by analysing central issues/concepts from 18th century to the present day; to consolidate and improve text analysis and oral, reading and writing skills, to revise problem areas in German grammar and introduce selected new or more complex grammatical and syntactic structures. To introduce the systematic study of translation theory and practice, to introduce students to a range of text-types and registers.

Syllabus: Lecture: German revolutions, democracy, fascism; cultural institutions, cultural life; the cultural and literary heritage. Tutorial work: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (note-taking, structuring presentations, summarising and reporting content); Literary text analysis & production; Translation theory and practice: historical and socio-political texts

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GE4248 - GERMAN LANGUAGE CULTURE AND SOCIETY 6
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: cultural, economic and political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates (also with regard to the EU): equality, environmentalism, cultural politics, social reforms, migration.

Tutorials: Oral presentation & discussion class: drawing on text and audio-visual materials to develop formal oral skills (presentations, talks, interviews). Text analysis & production: analysis & writing of project proposals, evaluations, etc.; Translation theory and practice: advertising, commercial and literary texts. This hour will be combined with a class providing an introduction to interpreting.

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GE4622 - GERMAN LITERATURE AND CULTURE 2: TEXT, WRITER AND READER
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To introduce students to aspects of text theory and reception theory. To show a literary work, its writer and its readers as products of their time and literature as a reaction to social and political developments.

Syllabus: Lecture: What is a text? The process of reading; intertextuality; reception of literature; relationship between work and biography of the writer; literature on stage: theatre; literature and politics. Tutorials: a) continuation of the introductory course to German literature; b) a study of the biography of two writers, their works and their time with a particular focus on dramatic texts.

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GE4626 - GERMAN LITERATURE AND CULTURE 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To examine major literary and cultural movements of the 19th century through a study of representative authors and various genres. To give students an understanding of the intellectual, artistic and philosophical milieu in 19th century German culture.

Syllabus: A study of classicism in drama and poetry and
its relationship to preceding movements: 'Enlightenment' and "Sturm und Drang"; poetic realism (1850-1890) in its social context - industrialisation, urbanisation, growth of the middle classes; and impressionism as an expression of the mood of pessimism at the turn of the century and its role in the "Wilhelminische Zeit" prior to World War I.

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GE4922 - GERMAN FOR BUSINESS 2A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To continue the business German foundation provided in Semester 1. To continue to provide an insight into socio-economic and political structures in Germany and to develop students’ familiarity with German culture. To equip students with the linguistic skills necessary to deal with business situations. To familiarise students with organisational structures of German firms.

Syllabus: Lecture: Postwar German-speaking countries: society and institutions; political, economic, cultural and literary trends; contemporary literature and culture in the German-speaking countries of Europe. Tutorials: a) analysis of literary texts to provide further access to the topics discussed in the lecture while at the same time further developing reading techniques, principles of textual analysis and text discussion in oral and written form; b) introduction to firm structures in Germany; induction in telephone techniques and other work-related interactive skills

Language laboratory: exercises in pronunciation, listening comprehension and grammar utilizing CALL facilities

Prerequisites: GE4921

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GE4924 - GERMAN FOR BUSINESS 4A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To prepare students for job interviews and applications and to reflect on their professional goals and career aspirations. To enable students to write and communicate successfully in a professional business and/or legal context in a form they are likely to encounter during their work experience and future career.

Syllabus: Lecture: Focus on job application process in German-speaking countries, future career familiarisation with current affairs with the focus on economic and legal topics;
Tutorial: a) production of business and legal correspondence;
b) introduction to translation into English and German; text work in form of summaries and descriptions of graphs etc. c) revision of all grammatical structures, emphasis on passive and indirect speech

Prerequisites: GE4924, GE4143

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GE4928 - GERMAN FOR BUSINESS 8A
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To develop the skill of precise writing in German. To provide an insight into the workings of the European Union (EU) and to examine the role of Ireland and Germany and current challenges and chances. To cover current topics and debates in the German-speaking countries. To prepare students to sit, on an optional basis, international examinations in Business German such as "Prüfung Wirtschaftsdeutsch international".

Syllabus: Lecture: cultural, economic and political issues in unified Germany, Austria and Switzerland; dealing with the past; nationalism and national identity; economic, cultural and social debates (also with regard to the EU): equality, environmentalism, cultural politics, social reforms and migration. Tutorials: a) discussions of literary texts, newspaper, magazine articles and TV programmes on topical issues connected with the lecture, focusing on the characteristics of different text types and language registers; b) examination of the institutions and policies of the EU with particular reference to Germany’s and Ireland’s role within the EU; c) revision of business material in general.

Prerequisites: GE4927

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H14068 - IRELAND AND THE WIDER WORLD, 1919-73
ECTS Credits: 6

History

Rationale and Purpose of the Module: The module will introduce students to the study of international history and Irish diplomatic history. It will examine Ireland’s changing place in the world and its involvement in international and European affairs during three key periods 1919 to 1939, 1939 to 1961. 1961 to 1973. It aims to uncover the key assumptions and doctrines underpinning the conduct of Irish foreign policy; to explore the Irish foreign policy formulation process, to examine the key bilateral and multi-lateral external engagements of the Irish state since independence. The module will provide a framework for studying the key concepts, institutions and chronology of the period. expected to lead the discussion on that issue. a) to introduce students to the key events which shaped Ireland’s relations with the wider world in the twentieth century b) to explore the historiography specific to the theme, c) to consider how the newly independent state engaged in diplomatic relations with other states and confirmed its legitimacy, d) to examine the principal features of the Irish diaspora in the US, Australia, New Zealand and South Africa and d) to research and produce a written analysis of selected topics based on accurate use of secondary and primary source material.

Syllabus: Introduction to the key themes in Irish foreign policy in 1919; The origins of Irish foreign policy; the diplomatic service in 1919; Anglo-Irish relations - Anglo-Irish treaty 1921, from empire to commonwealth, dominion status, imperial conferences, Statute of Westminster 1931; External Relations Act 1936, 1937 Constitution; Ireland and the United States - Wilson and peace 1918-1920, relief aid and recognition, immigration legislation; disarmament, normalisation; FDR and Ireland; the Spanish Civil war 1936; Emigration - the diaspora, the missionary movement, World War two - neutrality, the role of foreign diplomats in Ireland; ‘benevolent neutrality’, the balance sheet in 1945; the Marshall Plan, 1947-58; the Cold War - North Atlantic Treaty Organisation; Ireland and the European Economic Community; multilateral organisations - League of Nations, the United Nations; the developing world - South America, Africa and Asia 1945-74; Overview
HI4081 - EARLY MODERN IRELAND
ECTS Credits: 6

History

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

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

HI4082 - EUROPE: SOCIETY AND GOVERNANCE; 1890 - 1990
ECTS Credits: 6

History

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

Syllabus: Introduction to the course: war, revolution, restoration 1914-24; European societies at war; revolutionary situations/regime change; restoration of order; democracy/dictatorship and war 1924-44; American money and reconstruction; decadent decade? jazz, cocaine and sex; depression and sobriety; political mobilisation and violence; authority restored; conservatism/fascism/Stalinism; the twenty-year crisis: international relations; the Nazi new order and total war; Holocaust; reconstruction/Cold War 1944-74; 1945: Europe/Es azero hour? re-establishing order; Europe/Es political divisions; recovery, growth, and limits: the European economy; seducing Europeans: mobility, consumerism, and culture; the asecond sex/E; feminism and post-feminism; turning tides: youth, political protest and cultural revolt; the post-post war society and state (1970s-90); rebuilding the European house: Thatcher and Gorbachev; Which Europe? race, ethnicity, and memory; after the Wall: the return of æEuropeÆ

HI4102 - IRELAND: REVOLUTION AND INDEPENDENCE, 1898 - 1968
ECTS Credits: 6

History

Rationale and Purpose of the Module: This course charts the history of how Ireland emerged from the British Empire in the years following 1898.

Syllabus: The course is divided into lecture themes which address a wide range of important topics. These include the impact of the Boer War on Ireland, resurgence of the Irish Republican Brotherhood, rise of Sinn Fein, Larkin and the Union Movement, Connolly and Irish Socialism, 1916 Rising, War of Independence, Civil War and Partition, Ireland during and after the Second World War, the declaration of the Republic, Civil Rights and the origins of the modern 'Troubles'.

HI4132 - WARFARE AND DIPLOMACY: EUROPE IN THE SEVENTEENTH CENTURY
ECTS Credits: 6

History

Rationale and Purpose of the Module: This module offers students an overview of the political, social and economic history of continental Europe during the seventeenth century. It is intended as a spring-semester module to complement the autumn-semester module on sixteenth-century Europe, thus providing first-years with a more gentle introduction to the early modern period than has hitherto been on offer.

Syllabus: The Thirty Years War and the military revolution mercenarines and siege warfare; developments in congress diplomacy at Westphalia, the Pyrenees, Nijmegen and Utrecht-Rastatt; the structure of state building - Cardinal Richelieu and fiscal terrorism; rebellion, civil war and Frondes - the general crisis of the mid-seventeenth century; Dutch economic primacy and world trade; credit systems, deficit-finance, the development of state-funded debt and the stock exchange; the emergence of capital cities - Madrid, Vienna and Turin; court society and the world of the minister-favourite; the decline of Spain; France in the age of Louis XIV; the emergence of absolutist states from the 1660s; aristocratic constitutionalism in Sweden, Denmark and Poland-Lithuania; Austrian expansion into the Hungarian plain; the partition of the Spanish Monarchy in 1713-14.

HI4148 - THE HISTORY OF AUSTRALIA
ECTS Credits: 6

History

Rationale and Purpose of the Module: This course aims to provide a survey of the history of Australia between the establishment of the penal colony in New South Wales in 1788 and 1918.

Syllabus: The course comprises lectures dealing with such themes as 'Terra Nulius' and the choice of Botany Bay, the French reconnaissance, hulks and prison ships, convictism, Aborigines, the 'Irish Plots' of 1800 and Castle Hill revolt of 1804, Governors Bligh, Macquarie, Darling and Bourke, the Bigge Report, 'Black War', Anti-Transportation League, Gold, Squatters, the 'Kelly Outbreak', new colonies, Federation, ANZAC and Australia during the First World War.

ID4112 - DESIGN MECHANICS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module provides students with the necessary knowledge of mechanical stress and strain theory which when applied allows them to design mechanical components and/or structures capable of withstanding a required load. The module then studies the implementation of these designs by examining the components required to convert the designs into real world systems.


IE4214 - INDUSTRIAL ORGANISATION
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To introduce the subject of operations management, differentiating between operations and processes
To introduce performance optimisation within limited system resources
To prepare students for coop

Syllabus: Basic concepts: Operations versus processes and relationships to lead-time, Little/Es law, lean production and dynamic responsiveness, make-to-order versus make-to-stock, resources (4 Ms), types of manufacture, product-process matrix, production planning and control activities
Cost estimating: cost elements, materials, time and capacity, quality costs, overhead activity costs, final cost/selling price, break-even analysis and make/buy, budget variance control, target costing
Layout: types of layout, Systematic Layout Planning, work-station space allowances and templates, material load and/or adjacency measures of proximal desirability, Pareto analysis of flows, string diagrams, layout evaluation and improvement.
Project Planning: Gantt, networks, critical path, uncertain times, resource levelling, time-cost trade-offs, line-of-balance.
Dispatching clerical process, priority dispatching rules, kanban
Inventory control direct/indirect and opportunity costs of inventory, independent demand systems: perpetual and periodic reordering, safety stocks, dependent demand, bill-of-materials, material requirements planning, lot-sizing by EOQ for 1 product, Pareto ABC inventory analysis, limitations of EOQ, push versus pull, system requirements for small-lot production
Organization structure: organisation charts, determining processes and functions, grouping and integration, alternative structures.

IE4238 - OPERATIONS ANALYSIS AM
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To give students an understanding of the use of analytical models in the management of resources.
To provide students with skills for the application of linear programming and related models to resource management.
To give students an understanding of the technique of simulation and its application to systems design.

Syllabus: Introduction to operations management and its applications.
Introduction to Linear programming, transportation, assignment model and network models.
Introduction to Integer programming, problem complexity and solutions to integer programming problems.
Introduction to linear programming computer software.
Introduction to discrete event simulation, the simulation process.
steps involved in carrying out a simulation project. Computer simulation packages: computer implementation issues, development of simulation models using a simulation package.
Statistical aspects of simulation: input analysis, random number generation, output analysis.

IE4248 - PROJECT PLANNING AND CONTROL
ECTS Credits: 6
School of Engineering

Rationale and Purpose of the Module: To introduce performance optimisation within limited system resources
To prepare students for coop

Syllabus: Introduction to operations management and its applications.
Introduction to Linear programming, transportation, assignment model and network models.
Introduction to Integer programming, problem complexity and solutions to integer programming problems.
Introduction to linear programming computer software.
Introduction to discrete event simulation, the simulation process.
steps involved in carrying out a simulation project. Computer simulation packages: computer implementation issues, development of simulation models using a simulation package.
Statistical aspects of simulation: input analysis, random number generation, output analysis.

IN4004 - INSURANCE LAW AND CLAIMS
ECTS Credits: 6
Accounting & Finance

Rationale and Purpose of the Module: 1. To develop in the student an understanding of and insight into the insurance law and claims processes.
2. To examine the nature of the interface between insurance organisations and regulators.
3. To introduce students to the practice of insurance claims departments.
Stress will be given to the achievement of appreciation of recent developments in the field.

Syllabus: Provide the student with an understanding of the claims process and the law of insurance applying to Ireland. Additionally, effective investigation and negotiation techniques are taught to implement the complexities of law to give practical application scenarios. Personality and behaviour are analysed so that a negotiator or investigator can formulate optimum tactics in their vocation.

Prerequisites: IN4003
IN4008 - REINSURANCE / ART
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: To meet the specialist skills requirements of the re/insurance industry by equipping students with a thorough grounding in reinsurance contracts, innovations in product design and the process and structure of insurance linked securitisation (ILS).

Syllabus: The secondary risk transfer device of reinsurance is an essential functional discipline in an insurance organisation. The discipline involves the design and implementation of a reinsurance structure that meets pre-determined criteria of cost economy and effectiveness consistent with solvency assurance. Alternative risk transfer is an evolving set of methodologies that essentially incorporate capital market instruments as an alternative to orthodox corporate insurance programs. (a) Principles and functions of reinsurance/alternative risk transfer. Technical analysis of major product types - quota share; surplus; spread loss; loss stabilisation; operational features of managing the reinsurance/alternative risk transfer function - reinsurance accounting; accumulation control. (b) Statistical analysis of pure risk exposures, including computer based simulations of possible loss scenarios; selection of relevant risk transfer measures; underwriting techniques; exercises in reinsurance/alternative risk transfer programming.

Prerequisites: IN4003, IN4015

IN4014 - LIFE INSURANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The module covers the nature and purpose of a variety of life insurance contracts and students gain knowledge of life insurance underwriting. With regard to life insurance underwriting, particular attention is paid to underwriting of a variety of diseases that affect human anatomy, theories of mortality and morbidity risk, formulation of mortality tables, and the calculation of premium for term, whole life, endowment and annuity.

Prerequisites: IN4003

IN4418 - RISK CONTROL AND UNDERWRITING
ECTS Credits: 6

Accounting & Finance

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

Syllabus: Acquire a comprehensive understanding of the underwriting process within the context of risk management. Material damage insurance and risk control Loss of Profits Pecuniary insurance Liability insurances Loss reserve management Principles of insurance pricing

Prerequisites: IN4015

IN4738 - INTERNATIONAL INSURANCE
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: 1. To develop in the student an understanding of and insight international insurance. 2. To examine the nature of the interface between regulation and insurance. 3. To allow students to comprehend the nature of cross-border business in insurance

Syllabus: The students will gain a general understanding of international insurance and produce an some in depth analysis of specific examples

JA4212 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To consolidate and increase abilities already gained in understanding, speaking, reading and writing, and further studentsÆ understanding of Japanese society, as well as to develop further strategies for autonomous language learning.

Syllabus: Listening exercises dealing with street directions descriptions of places, abilities and family. Speaking practice emphasising talk about oneÆs own and othersÆ families in the correct register descriptions of places. Reading descriptions of towns in Ireland and Japan as well as passages about Japanese sport and pastimes. Writing more complicated passages about family and place, pastimes, likes and dislikes. This will involve the introduction and practice of a further 80 kanji, bringing the total learned to 160. Discussion of aspects of Japanese society e.g. the economic system, education, Japanese literature.

Prerequisites: JA4211

JA4246 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enable students to understand more advanced authentic and near authentic, modern Japanese texts and to produce a greater range of spoken and written texts; to foster in students an understanding and appreciation of modern Japanese writing; to consolidate their knowledge of issues in contemporary Japanese society.

Syllabus: Listening practice concentrating on authentic Japanese; speaking exercises using various levels of
formal and informal Japanese; using language with the correct nuances of regret etc. Speaking to a group on various topics. Reading authentic and near-authentic material on Japanese life and culture as well as news stories. Writing memos, faxes, e-mails, descriptions and summaries. Use of a further 120 kanji to bring the total up to 500 characters. Translating short passages of various levels from Japanese to English.

Prerequisites: JA4213

JA4248 - JAPANESE LANGUAGE, CULTURE AND SOCIETY 6
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To consolidate students' previous acquisition of Japanese and to bring them to an upper intermediate level of language use in understanding of Japanese society, as well as to develop speaking, reading and writing, and further students' understanding of Japanese society, as well as to develop further strategies for autonomous language learning.

Syllabus: Listening exercises dealing with street directions descriptions of places, abilities and family. Speaking practice emphasising talk about ones own and others families in the correct register descriptions of places. Reading descriptions of towns in Ireland and Japan as well as passages about Japanese sport and pastimes. Writing more complicated passages about family and place, pastimes, likes and dislikes. This will involve the introduction and practice of a further 80 kanji, bringing the total learned to 160. Discussion of aspects of Japanese society e.g. the economic system, education, Japanese literature.

Prerequisites: JA4911

JA4914 - JAPANESE FOR BUSINESS 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enable students to understand more advanced authentic and near authentic, modern Japanese texts and to produce a greater range of spoken and written texts; to foster in students an understanding and appreciation of modern Japanese writing; to consolidate their knowledge of issues in contemporary Japanese business and society.

Syllabus: Listening practice concentrating on authentic Japanese; speaking exercises using various levels of formal and informal Japanese; using language with the correct nuances of regret etc. Speaking to a group on various topics. Reading authentic and near-authentic material on Japanese business life and culture as well as news stories. Writing memos, faxes, e-mails, descriptions and summaries. Use of a further 120 kanji to bring the total up to 500 characters. Translating short passages of various levels from Japanese to English.

Prerequisites: JA4913

JA4918 - JAPANESE FOR BUSINESS 8
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To consolidate students' previous acquisition of Japanese and to bring them to an upper intermediate level of language use in understanding of Japanese culture and society.

Syllabus: Listening practice using authentic materials. Further practice in the use of polite language. Vocabulary consolidation; presentations, practice for interviews. Reading practice of authentic news stories, and authentic passages relating to Japanese society and modern literature. Translation of authentic passages, literary or business-related. Writing of summaries, descriptions, letters, and passages expressing opinions. Study of a further 200 kanji, to bring the total up to 750 characters.

Prerequisites: JA4917

JM4004 - MAGAZINE JOURNALISM
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: To give students a thorough understanding of the magazine market, from lifestyle magazines to Business to Business publications, including contract and customer publishing. To enable students to think creatively and develop their ideas to help them understand how magazines work and to create a pitch for a new magazine.

Syllabus: Students will learn how the magazine market works, the differences between the various different kinds of magazine, readership markets and revenue streams. Professionals will speak about their part of the industry to give the students a broad understanding. Students will select a magazine and research it, from circulation to readership, advertising and other revenues. They will obtain interviews to clarify any points, and produce a profile of the magazine, which will form the basis of a presentation to the class. In the second half of the semester students will work on ÔProject Oscarö: in groups of about five, they will generate an idea for a new magazine, research the market, produce reader profiles, produce details of features, design dummy pages and pitch their projected magazine to the class, tutors and a magazine professional. Assessment will be by
coursework: production of a portfolio of work completed during the course, and contributions to class discussions.

JM4012 - JOURNALISTIC WRITING 2  
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Journalistic Writing 2 follows on from JM4021 Journalistic Writing in Semester 1. The course aims to develop students’ writing skills in producing news articles, short features and reviews for a variety of publications - print and online.

Syllabus: Students will extend their knowledge of different journalistic forms, including short features, profiles of each other and visiting speakers, vox pops, and reviews of music, clubs or bars. They will be encouraged to reflect on and analyze each other’s and professional work through a course web forum. Regular news writing workshops will continue, including one on a breaking news exercise and a wrap story exercise. They will be helped to begin writing for student publications, and will be encouraged to write their own blogs. Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

Prerequisites: JM4021

JM4014 - FEATURE WRITING  
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: Feature Writing aims to develop students’ writing skills in producing features of different types for a variety of publications.

Syllabus: Students will learn how to generate ideas for features, pitch feature ideas at mock feature conferences, research using printed and web sources and face to face and telephone interviews, develop their ideas for specific target publications, and write lively material. They will work on feature structure and writing standfists. They will produce publishable features of different kinds, including an interview/profile, colour writing or reportage and an analytical researched feature. They will be encouraged and helped to get work published either in a student or professional publication, or on their own websites. Assessment will be by coursework: production of a portfolio of work completed during the course, and contributions to class discussions.

JM4018 - INDIVIDUAL JOURNALISM PROJECT  
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: The individual project aims to help students in-depth reporting, broadcasting, writing and design skills through work on a substantial project of their own choice. It aims to help them produce an extended piece of journalism with appropriate research.

Syllabus: Students will choose and research a subject of their choice using all available resources and personal interviewing. They will be guided by a supervisor to ensure their research will be adequate to produce a 4,500 word extended journalistic product, either as one piece, or a group of related pieces. Students will also be required to produce a 30-minute radio documentary or 10-minute television documentary or multimedia project on this or a related topic, or a series of shorter packages. A target publication and broadcast outlet must be identified and justified. The final work will be designed for print/web/edited for broadcast as appropriate and presented as part of a portfolio of publications produced while a BA student. Students should conduct a series of interviews as appropriate and follow ethical guidelines and use on-the-record sources. Students will demonstrate cognisance of news processes, evidence of research, ethical considerations and sound editorial judgement in the production of the project and portfolio.

JM4022 - INTRODUCTION TO SOCIAL MEDIA  
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to equip students with the web-based research, organisational and value judgement skills necessary to examine and understand critically the power of social media in a globalised world. It aims to enable students to become better critical thinkers and researchers by giving them the skills to understand social media, to question its relevance, its accuracy and its legitimacy; and to construct news in a social media format. It will equip students with communication skills that are appropriate to a first-year level and which will enable them to participate effectively in their university degree.

Syllabus: This module is a foundation for new university students that will introduce them to thinking critically about social media. Taught elements will include concepts drawn from theoretical communications, social and media studies, as well as practical approaches including hierarchical news writing and information construction. The module will examine the changing nature of how news is disseminated through social media and investigate citizen engagement with news. It will give a practical introduction to the use of social media for the purposes of information gathering, as a source for news and as a potential agent of democratisation of media and society. Practical cases will be understood through recent theoretical perspectives on human collaboration and communication. The changing dynamic of news from the traditional (linear) model to the new media (circular) model will be explored. The course has a strong focus on both the use of social media for practical exercises and on evidence-based critical thinking.

JM4028 - CURRENT ISSUES IN IRISH MEDIA  
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: * To familiarise students with the key contemporary issues in Irish media.
* To give students an overview of the diversity of Irish media contexts.
* To introduce students to a range of media professionals from a range of different contexts and media.
* To enable students to produce an in-depth study of a chosen media context.

Syllabus: * The course is a seminar module. Each week a practising media professional will come to the University to talk to students about their particular working environment and the key issues facing them as media professionals and their particular organisations in contemporary Ireland.
* The range of seminar speakers will be as wide as possible, representing different media, different contexts (local, regional, national, public, private, voluntary) and different linguistic (Irish language and new allochthonous languages) and cultural environments.
Fundamental concepts.


LA4002 - JURISPRUDENCE
ECTS Credits: 6

Law

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


LA4006 - MEDICAL LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: The aim of this module is to provide students with an understanding of the legal and ethical issues associated with the practice of medicine. The interface between law and medicine has become increasingly controversial in recent years. Aside from traditional concerns such as those relating to medical confidentiality and access to medical records, an increasing awareness of the need to recognise and respect the autonomy of patients has raised new concerns which the legal system must address. This module seeks to introduce students to the challenges posed in the legal regulation of medical practice by introducing them to the law relating to medical confidentiality, access to medical records, consent to treatment and end-of-life decision-making.

Syllabus: This module covers: legal and ethical issues surrounding medical confidentiality and access to medical records; human rights and ethical perspectives on autonomy in healthcare decision-making; informed consent to medical treatment; capacity to consent in relation to minors and those with mental incapacity; refusal of treatment and; end-of-life decision-making.

LA4008 - COMPANY AND PARTNERSHIP LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To provide students with an understanding of the legal regulation of the primary forms of business organisation: the corporate entity and the partnership unit.

This module will be offered on the programme Higher Diploma in Accounting (title to be changed to Professional Diploma in Accounting)

Syllabus: Corporate formation: types of companies, formalities, advantages and disadvantages of incorporation, corporate personality, piercing the veil, groups of companies; corporate governance; role of shareholders, directors, employees, directors' duties, AGM, accounts and audits; minority shareholder protection; protection of parties dealing with corporations: creditors, voluntary and involuntary, charges over companies; ultra vires contracts; capital integrity; minimum requirements, distributions out of profits, repayments of capital; corporate termination: liquidation, receivership, winding up, examinership, amalgamations and reconstructions. Partnerships; joint and several liability; formation of partnerships; dissolution of partnerships; limited partnerships.

LA4012 - COMPARATIVE LEGAL SYSTEMS
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To show the evolution of some of the distinguishing features of the major legal families and to examine some alternatives offered by non-western cultures.


LA4032 - CRIMINAL PROCEDURE
ECTS Credits: 6

Law

Rationale and Purpose of the Module: This course will consider the procedures to be used in the criminal justice system from the earliest moment of investigation, right through to sentencing. The system as a whole will be evaluated from various value-based positions, encouraging critical reflection among students. Key areas such as policing, trial procedure, and the sentencing process will be considered in depth. The course will involve a mixture of legal detail and sociological theory to give a rounded appreciation of the issues addressed. By the end of the course students should have a strong, and critical, understanding of how the criminal justice system operates.


LA4035 - LABOUR LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To familiarise the student with the legal regulation of contracts of and for employment, industrial relations and remedies thereto.

Syllabus: Nature of Labour law, legal classification of the provision of labour, the role of statute in Labour Law. Protective legislation and conditions of employment, health and safety at work, sex discrimination, equal pay. Termination of employment, redundancy, minimum notice and unfair dismissal. Trade unions, legal regulation thereof, worker participation, EC

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**LA4036 - INTELLECTUAL PROPERTY LAW**  
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** Intellectual property (IP) is of great importance in modern society and the provision of legal protection to owners of intellectual property is considered by many to be critical to fostering ideas, rewarding innovation and stimulating economic growth. The significance of IP may be identified across a variety of sectors including the engineering, pharmaceutical, medical, entertainment, fashion and computer/software industries. The aim of the module is to give students an understanding of the various sources and forms of intellectual property (I.P.) rights including patent, trademark, copyright and design protection.

**Syllabus:** This module will explore the various sources and forms of intellectual property (I.P.) rights including:

1) patents  
2) trademarks  
3) copyrights  
4) designs

The source of these rights, their limitations, infringement and remedies available for breaches will also be covered.

The course will also examine common law protections available to protect intellectual property including the tort of passing off and breach of confidence.

The focus will be on Irish IP law but will also examine relevant EU directives and global IP treaties.

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**LA4038 - FAMILY LAW**  
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** The aim of the course is to familiarise students with the core concepts of Irish family law.

**Syllabus:** The module will examine the following: nullity; domestic violence; child custody and access disputes; maintenance, separation agreements; judicial separation; divorce; preliminary and ancillary relief in judicial separation and divorce proceedings; and the non-marital family.

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**LA4042 - ADMINISTRATIVE LAW**  
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** To provide students with the mechanisms to test whether any decisions or actions taken by government or governmental agencies are lawful, and examine the redress available for aggrieved citizens.

**Syllabus:** Historical political and administrative background to administrative law within Ireland; relationship of administrative law with the Constitution of Ireland/ Delegated legislation, decisions, administrative acts, informal rules, circulars. The use of discretion. The principles and procedures of judicial review. Remedies.

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**LA4044 - LAW OF THE EUROPEAN UNION 2**  
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** This module will review and identify major developments in the substantive law of the European Union, its interpretation and development, with special reference to the foundations and common rules and policies of the Common Market and the realisation of an internal market. The policies dealt with will include i.e. the free movement of goods, persons, services, capital and payments, competition, social policy and animal welfare.

**Syllabus:** The module covers, in the first instance, background to the single market/common market. The module proceeds to examine in detail the Four Freedoms: free movement of goods, the free movement of persons (including workers, families/dependents, students, retired citizens, the freedom of establishment and the provision of services. Competition Law, including restrictive agreements and abuse of a dominant position will be examined. Social policy, (Equal pay and treatment, same sex couples, transsexuals etc.) will be covered and the module will end with a discussion on the impact of European Law on the animal welfare with specific reference to Treaty developments form the 1960s and the initial connection between animals and agriculture to recognition of the sentience of animals in the Treaty of Amsterdam and Lisbon, recent development including the Cat and Dog Fur Regulation and the Cosmetics Directive.

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**LA4048 - ADVANCED LAWYERING 2**  
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:** Section A. Working in small groups with a dedicated faculty advisor, students will complete study and participation in the topics outlined in Section A of Advanced Lawyering I, dealing with such issues as the PIAB and Commercial Court, including collaborative law, mediation and arbitration.

Section B. Students will continue with their selection from Advanced Lawyering I: Business Law Clinic; e-Journal; Research Article; Conveyancing Problem; Moot Trial; ADR process

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**LA4052 - INTRODUCTION TO LAWYERING 2**  
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 begun to deal with core issues in the practice of law including logical reasoning, questioning, option generation, problem solving, oral argument and advocacy, together with
LA4058 - HUMAN RIGHTS LAW
ECTS Credits: 6
Law
Rationale and Purpose of the Module: The aim of this module is to introduce students to the study of international human rights law.

Syllabus: Upon successful completion of this model students will have a detailed knowledge of the international human rights law framework and will be familiar with the major universal and regional systems of human rights law and the legal value and authority of declarations, decisions, judgments and other output engendered by them. The syllabus will focus extensively on the Council of Europe structures for human rights protection and the United Nations treaty system with emphasis on the impact that the international system has on Irish law. Students will be expected to critically explore the development and expansion of this emerging field of law.

LA4082 - LAW OF EVIDENCE
ECTS Credits: 6
Law

LA4222 - CRIMINAL LAW 2
ECTS Credits: 6
Law
Rationale and Purpose of the Module: By building on Criminal Law 1, to examine the principal criminal offences and elements of criminal procedure.


LA4320 - LAW OF TORTS 2
ECTS Credits: 6
Law
Rationale and Purpose of the Module: To examine the tortious concepts of trespass, nuisance, defamation and economic torts. To evaluate remedies in the area of Tort Law and the assessment of damages.


LA4440 - CONSTITUTIONAL LAW 2
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: The aim of this course is to examine the fundamental rights provisions of the Irish Constitution, considering always the obligations of the state under international law. Topics to be covered include fundamental rights theories, unenumerated rights and directive principles of social policy under the Irish Constitution.

LA4540 - COMPANY LAW 2
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 of the Law of Business Associations modules but will use the more commonly used name of Company Law. It will be to the advantage of students, 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 module covers the administration of companies insofar as topics covered include; the appointment, role and duties of Directors, the role and duties of the Company Secretary and the Annual return obligations of companies. The module also covers issues of dividends and the company law limitations on profit distributions. In addition, the module covers the various
methods of enforcement of company law. The consequences of a company's secured borrowings are also considered in terms of the secured party enforcing security by appointment of a receiver. The statutory scheme and facility of examinership for a company in financial difficulty is reviewed and the duties of court appointed examiners analysed. Finally, the module covers the various methods of winding up of companies and the roles of different types of liquidators. The duties of liquidators are examined and the connections between those duties and the schemes and bodies of company law enforcement are reviewed.

LA4620 - LAND LAW 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To familiarise the student with a detailed knowledge of the regulatory aspects of the use of real property, including landlord and tenant law and the law of succession.

Syllabus: The laws relating to succession, statutory control of the right to devolve property upon death, wills and intestacies. Landlord and Tenant Law, nature and creation of the relationship, determination of the relationship, statutory control of tenancies, public welfare codes. Lesser interests in real property including licences and covenants. The distinction between leases and licences. Mortgages.

LA4828 - EQUITY AND TRUSTS 2
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To inculcate in the student an understanding of the modern law of trusts, their creation and regulation.

Syllabus: The trust, classification of trusts, express, implied, resulting, constructive and charitable trusts. The requirements of a trust, the constitution of trusts. General principles relating to trustees, their obligations and duties, powers of trustees, variations in a trust, fiduciary responsibilities of trustees. Breach of trust and remedies thereof.

LA4922 - SPORT AND THE LAW
ECTS Credits: 6

Law

Rationale and Purpose of the Module: To examine the law relating to the governance and regulation of sport.

Syllabus: Sport and the Law will examine the interaction between the law and sport. The course will examine a number of topics, including what is sport and the law, violence in sport, drug testing, contract and employment issues, administration and judicial review, commercial and competition law, arbitration and alternative dispute resolution.

LA6051 - PENOLOGY AND VICTIMOLOGY
ECTS Credits: 9

Law

Rationale and Purpose of the Module: The purpose of this course is to provide students with an understanding of punishment, criminal justice and social regulation. In particular the aims of the module are as follows: to provide analyses of the primary penal disposals (both contemporary and historical) utilised in society; to highlight the various political, social, cultural and economic determinants that underpin the provision of penal dispositions; to encourage theorisation about punishment and penal responses; to highlight the needs and concerns of victims of crime; to determine how change is possible in the penal complex - in particular, how sanctions are modified or supplanted and how stakeholders, such as victims, emerge; to examine new 'logics' and 'discourses' on punishment and justice as they emerge; and, to provide a framework of understanding modern penal systems and the forms of social organisation in which they operate.

Syllabus: This module covers the emergence of penal welfarism and individualisation of treatment, the culture of control in late modern society, the emergence of prison and the disciplinary society, issues such as exclusion, governance, and expressive punishments, the politicisation of law and order, the return of the victim, Norbert Elias and the civilising society; Emile Durkheim and social solidarity; Cohen's dispersal of discipline thesis, and crime and punishment in Ireland.

MA4002 - ENGINEERING MATHEMATICS 2
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 Integral Calculus and Differential Equations. To give the student an understanding of the Matrix Algebra and its application to solving systems of linear equations. To give the student an understanding of the Matrix Algebra and its application to solving systems of linear equations. To introduce the student to Multivariate
Calculus.

**Syllabus:**
- **[The Indefinite Integral]:** Integration techniques including integration of standard functions, substitution, by parts and using partial fractions.  
- **[The Definite Integral]:** Riemann sums, and the Fundamental theorem of calculus.  
- Application of integration to finding areas, lengths, surface areas, volumes and moments of inertia.  
- **[Numerical Integration]:** Trapezoidal rule, Simpson’s rule, other Newton-Cotes formulae and Gaussian quadrature.  
- **[Ordinary Differential Equations]:** first order including variables separable and linear types. Linear second order equations with constant coefficients. Numerical solution by Runge-Kutta.  
- [Functions of several variables and partial differentiation. ] Fitting a line or curve to a set of data points.  

**Prerequisites:** MA4001

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**MA4004 - ENGINEERING MATHEMATICS 4**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To provide students with an understanding of the fundamentals of probability and its relation to statistics. To introduce statistical inference through the concepts of estimation and hypothesis testing. To apply these concepts to problems from both daily life and engineering/science.

**Syllabus:**
- The concept of variation - discrete and continuous variables.  
- Graphical representation of data - frequency tables, histograms, bar charts, piecharts, boxplots.  
- Descriptive statistics - measures of location and dispersion.  
- Basic concepts of probability - Frequency interpretation and axioms of probability. Probability of an event.  
- Discrete and continuous random variables - expectation and variance, moments.  
- Discrete probability distributions - Binomial, Geometric, Poisson.  
- Continuous probability distributions - Exponential, Normal, Uniform distributions.  
- The central limit theorem.  
- Statistical inference - interval estimation and hypothesis testing, type I and type II errors, one and two-tailed tests.  
- Linear regression - testing for an association between two continuous variables.

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**MA4006 - ENGINEERING MATHEMATICS 5**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To introduce the student to elementary Vector Calculus. To give the student a broad understanding of analytical and numerical techniques for solving Partial Differential Equations.

**Syllabus:**
- Vector Calculus: Scalar and vector fields, contour maps, directional derivative and gradient vector of a scalar field, divergence and curl of a vector field (line, surface and volume integrals), Integral Theorems (Gauss’, Green’s and Stokes’).  

**Prerequisites:** MA4003

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**MA4014 - SCIENCE AND ENGINEERING MATHEMATICS**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** To develop the students’ understanding and problem solving skills in the areas of integral calculus and differential equations with application to engineering problems; to give the student an understanding of matrix algebra and its application to solving systems of linear equations; to introduce the student to the Laplace Transform and its use in solving ordinary differential equations.

**Syllabus:**
- Review definite integral as an accumulation;  
- Definite integral applications: population growth, acceleration problem solving;  
- Differential equations: first order (separable and linear), linear homogeneous second order, applied problems;  
- Matrices and linear systems: basic concepts: addition, multiplication, determinants, inverse of a matrix (2x2, 3x3);  
- linear transformation; eigenvalues and eigenvectors; matrix diagonalisation; power of a diagonal matrix.  
- Laplace transforms: improper integrals, transforms of common functions, inverse transforms; transform of a derivative; application of Laplace transforms to finding solutions of ordinary differential equations; transfer functions.

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**MA4102 - BUSINESS MATHEMATICS 1**

**ECTS Credits:** 6

**Mathematics & Statistics**

**Rationale and Purpose of the Module:** 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.

**Syllabus:**
- Mathematics of finance: compound interest, geometric progressions, frequency value, sinking funds, annuities.  
- Matrices and determinants: examples, definitions, matrix operations, (2x2) and (3x3) matrices: examples, definitions, matrix operations, (2x2) and 3x3 determinants, matrix, inversion, representing and solving linear systems, Cramer’s rule. Linear programming: linear inequalities in 2 variables, graphing linear inequalities, feasible region, graphical method of solution.  
- Descriptive statistics: mean, standard deviation, median, inter-quartile range, histogram, ogive, percentiles. Introduction to probability: events, conditional probability, independence, Bayes’E formula.  
- Random variables: the notion of a probability distribution, binomial distribution, Poisson distribution, the notion of a density function, the exponential density,
the normal density, expectation and variance, the 
Central Limit Theorem, the normal approximation to the 
binomial. Fitting distributions to data: method of 
moments, maximum likelihood, assessment of goodness 
of fit.

This involves
1) presenting data using descriptive measures and 
graphical means,
2) presenting hypotheses that can be tested statistically, 
together with an appropriate interpretation of the test 
results
3) providing an introduction to correlation, linear 
regression and time series analysis

Syllabus: 1. Sampling methods and descriptive statistics - collection and tabulation of data. 
Summary measures and graphical presentation of 
data.
2. Basic concepts of probability - probabilities of the 
union and intersection of events, conditional probability 
and contingency tables.
3. Normal probability distribution and applications to 
control charts
4. Applications of the central limit theorem - interval 
estimation.
5. Hypothesis testing - one and two sample hypothesis 
tests and 
non-parametric tests for skewed quantitative data.
6. Chi-squared test for independence
7. The Pearson and Spearman correlation coefficients 
and simple linear regression.
8. Introduction to Time Series Analysis - trends and 
seasonal variation, 
use of moving averages.

MA4104 - BUSINESS STATISTICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To provide the 
statistical framework which will enable students in 
economics, accounting, finance, personnel management 
and marketing to perform statistical analysis within their 
subject disciplines.

To equip students with the skills to interpret and 
summarise results generated by statistical packages.

Syllabus: The concept of a random sample, the 
sampling distribution of the sample mean with 
applications to confidence intervals, hypothesis testing, 
and sample size determination, the sampling distribution 
of the sample proportion with applications to confidence 
intervals, hypothesis testing, and sample size 
determination, comparing two means, comparing two 
proportions, the chi-squared test of independence, 
Simpson/Es Paradox, simple linear regression, 
correlation, residuals.

MA4114 - APPLIED BUSINESS STATISTICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: This module 
contains the second half of MA4102 and the first half of 
MA4104.

This course is designed to give students the statistical 
background required to apply 
statistical techniques to data both of general interest and 
of interest specific to 
business activity.

MA4128 - ADVANCED DATA MODELLING
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To ground the 
students in Applied Multivariate Analysis. The module 
serves business and mathematics students. It introduces 
the mathematical statistical ideas behind Principal 
Component Analysis, Factor Analysis, Cluster Analysis, 
Discrimination Function and the Multiple Linear Logistic 
function. The students learn how to implement these 
techniques in Minitab to become competent in the 
analysis of a wide variety of multivariate data structures.

Syllabus: Principal Component Analysis, Cluster 
Analysis, Discrimination Function and the Multiple Linear 
Logistic function and Factor Analysis are introduced in 
this order. From the outset the Minitab (Statistical 
Package) is introduced. Different types of multivariate 
data structures are introduced. The analyses appropriate 
to each type of data structure are deduced from general 
principles and their implementation in Minitab described. 
Many different data structures are considered. Emphasis 
is placed on the integration of the different methods of 
analysis available in order to achieve an effective 
interpretation and simple summary of the multivariate 
data. Report writing, communicating the interpretation to 
non-technical business managers, is taught.

Prerequisites: EC4307, MA4125

MA4302 - APPLIED STATISTICS FOR ACCOUNTING
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: This course is 
designed to give students the statistical background 
required to apply statistical techniques to data both of 
general interest and of interest specific to business 
activity.

This involves
1) presenting data using descriptive measures and 
graphical means,
2) presenting hypotheses that can be tested statistically, 
together with an appropriate interpretation of the test 
results and 
3) analysing time series data and prediction. In order to 
deal with large data sets, the lectures are accompani 
by computer laboratories using a statistical computer 
package (SPSS).

Syllabus: 1. Sampling methods and descriptive statistics - collection and tabulation of data. Descriptive measures 
and graphical presentation of data.
2. Basic concepts of probability - probabilities of the 
union and intersection of events, conditional probability, 
contingency tables.
3. Discrete probability distributions - the binomial 
distribution. Expected values.
4. Continuous probability distributions the normal and 
Pareto distributions relevance to natural and economic 
phenomena.
5. Applications of the central limit theorem - interval 
estimation.
6. Hypothesis testing - one and two sample tests for 
population proportions and means. Tests of association.
7. The Pearson and Spearman correlation coefficient and 
simple linear regression.
8. Time Series Analysis. Trends and Seasonal Variation. 
Use of moving averages. Prediction.
9. Use of a statistical package (SPSS) for data input and
transformation, as well as carrying out the statistical methods described above.

MA4602 - SCIENCE MATHEMATICS 2
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To develop the fundamental concepts and basic tools of calculus. To introduce applications of calculus in science and technology. To develop and integrate the basic scientific mathematical skills.

Syllabus: [Integration and applications:] indefinite integral as antiderivative; integration by substitution; definite integral as area; Fundamental Theorem of Calculus; integration by parts; calculation of areas; applications in science. Introductory treatment of Simpson's rule. [Functions of the Calculus:] domain and range; inverse trigonometric functions, hyperbolic functions, their graphs and derivatives. [Curve sketching:] symmetries; intercepts; restrictions on range; discontinuities; uses of first and second derivatives; turning points; behaviour for large and small x; asymptotes. [Series:] sequences; arithmetic and geometric series; infinite series and convergence; ratio and comparison tests; power series; Maclaurin and Taylor series; addition, multiplication, differentiation and integration of power series; use as approximation of a function; limits, l'Hopital's rule.

Prerequisites: MA4601

MA4604 - SCIENCE MATHEMATICS 4
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: The student should be able to: Compute using real and complex numbers; solve basic ordinary differential equations; find critical points of functions of one variable; represent a function using Fourier series.

Syllabus: Functions of the Calculus: graphs and functions, domain and range, inverse trigonometric functions, hyperbolic functions. Curve sketching: symmetries, intercepts, restrictions on range, discontinuities, turning points, behaviour for large and small x; asymptotes; Series: sequences, series as sum of sequence, sums of arithmetic and geometric series, infinite series and convergence, ratio and comparison tests, power series, Maclaurin and Taylor series, manipulation of power series, differentiation and integration of power series, use as approximation of a function, limits, l'Hopital's rule; Integration and applications: indefinite integral as antiderivative, integration of standard functions, definite integral as area, integration by substitution, integration by parts, applications to: area, volumes, surfaces of revolution, numerical integration including Simpson's rule; Partial derivatives: functions of two variables, partial derivative, definition and examples, differential and total differential, higher partial derivatives, application to small errors.

Prerequisites: MA4701

MA4704 - TECHNOLOGICAL MATHEMATICS 4
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: To introduce students to the fundamental ideas of uncertainty through probability. To lay a good foundation for the stream of statistically oriented modules in the fourth year. To introduce students to the most widely used statistical distributions and applications thereof. To introduce statistical inference through the concepts of estimation and hypothesis testing.

Syllabus: [Variables] - continuous and discrete. [Representation of variables] - frequency tables, histograms, bar charts, etc. [Reduction of variables] - measures of location and dispersion, mean, variance, range, median, quartiles, etc. [Introduction to the fundamentals of probability] - Experiments, sample spaces, events. Laws of probability - addition and multiplication, conditional probability. [Bayes theorem] - prior and posterior distributions. [Introduction to random variables], probability density functions. [Special distributions] - binomial, Poisson; geometric, uniform, exponential, normal. [Statistical inference] - point and interval estimates, standard error of an estimator, hypothesis testing, one and two-tailed tests. One and two sample problems for the mean, variance and proportion. [Non-parametric tests] - sign test, rank tests.
**[Correlation and Regression] - method of least squares.**

Prerequisites: MA4702, MA4701

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**MA4708 - QUALITY CONTROL**
ECTS Credits: 6

**Mathematics & Statistics**

Rationale and Purpose of the Module: to develop skills in the use of the appropriate statistical techniques in quality control

Syllabus: history and development of techniques statistical process control charts: capability: C_p, Cpk, R&R studies control charts (Shewart), variable and attribute, control & out of control, specifications, short and long run applications, proportion defective, ARL, PPM cusum, multivari acceptance sampling: AQL, CQL, risks, construction of sampling plans, various international standards

Prerequisites: MA4707

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**MB4002 - ALGEBRA 2**
ECTS Credits: 6

**School of Education**

Rationale and Purpose of the Module: To promote an understanding of basic algebraic concepts of discrete mathematics.
To examine the use of transformations in geometry.
To apply discrete mathematics in the solution of various applied problems.

Syllabus: Mathematical logic: statements, sentences, truth tables, quantifiers, proof; Sets: notation, definition, set operations; Relations: equivalence relation, partitions, congruence; Mappings: injective, surjective, bijective maps, composition, inverse; Mappings in the plane: projections, transformations; Matrix representation; Algebra of sets: De Morgan's law, principle of duality; simple applications to switching theory.

Prerequisites: MB4001

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**MB4008 - GROUPS AND ALGEBRAIC STRUCTURES**
ECTS Credits: 6

**School of Education**

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

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

Prerequisites: MB4001, MB4002

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**MB4018 - DIFFERENTIAL EQUATIONS**
ECTS Credits: 6

**Mathematics & Statistics**

Rationale and Purpose of the Module: To develop and understanding of the theory of differential equations.
To study standard solution techniques.
To apply differential equations to real situations.

Syllabus: Basic concepts: order, degree, solution, boundary and initial conditions, graphs of solutions; Mathematical modelling: examples from mechanics and population growth; Classical mechanics: velocity, acceleration, motion of a rigid body; Newton's Laws, simple harmonic motion, elastic strings and springs; Projectile motion and orbital motion; First order ODEs: variable separable, homogeneous linear and exact with applications; Second order differential equations: linear with constant coefficients, trial method and D-operator method with applications; Numerical solution of first order differential equations: Euler to Runge-Kutta.

Prerequisites: MA4702

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**MD4002 - PRACTICUM 2A**
ECTS Credits: 6

**Humanities**

Rationale and Purpose of the Module: Development of student/E's primary performance interest, whether instrumental, vocal or dance. Also the development of musicianship and body awareness skills.

Syllabus: This module is divided into two parts. The first is the development of the students/E's performance practice and will occur in the stylistic context most common to the performance practice of the student. However, tutors will begin to encourage students to look to other styles and repertoires current within a primarily Irish context. This will take place in the context of one-on-one classes and develops from the progress in Practicum 1a.

The second part of these modules will be related to performance skills and again this element will be divided into two separate streams for musicians and dancers. Musicians will take Keyboard Skills and Aural Training which include keyboard harmony (vamping, chordal analysis and application, both aural and written), aural skills (transcribing tunes and songs, awareness of traditional forms and styles, sight reading and sight singing). It is important to emphasise that the orientation of this stream of multi-skill development will be towards the needs and realities of traditional Irish music and musicians but with a wider context in mind. Dancers will take Movement Awareness. This will include practical dance workshops to introduce some of the movement principles that inform other dance practices today. It will also include an introduction to techniques and practices designed to promote the release of tension in the body in order to facilitate greater ease of movement. It will also include an introduction to the use of visual imagery as a way to develop an understanding of the correct alignment in movement. Finally an introduction to supplementary practices used by dancers as part of their training eg. Yoga, Feldenkrais, Alexander technique and Pilates. Improvisation will be undertaken in practical workshops to introduce the concept of improvisation as a means of exploring movement possibilities and also expanding movement vocabulary. Improvisations will include working with movement themes, dramatic themes,
Improvisation will be undertaken in practical workshops to introduce the concept of improvisation as a means of exploring movement possibilities and also expanding movement vocabulary. Improvisations will include working with movement themes, dramatic themes, props, text and visual stimuli.

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**MD4008 - PRACTICUM 7A MAIN PERFORMANCE INTEREST**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** The development of a final extensive performance.

**Syllabus:** In this module students, with relevant tutors and under the direction of course director, will design and undertake an extensive, hour long recital which will be representative of both their own stylistic interest but also a range of diverse music and/or dance styles (in the case of dance, two to three smaller performances over a similar number of days will be considered).

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**MD4012 - PRACTICUM 2B SECONDARY PERFORMANCE INTEREST**

**ECTS Credits:** 6

**Humanities**

**Rationale and Purpose of the Module:** To broaden the base of performance skills of the students to include other instrumental, vocal and dance aspects of the tradition

**Syllabus:** In this module students will be introduced to the practice of a broad range of instrumental, vocal and dance skills they will otherwise be unfamiliar with. Dancers and singers will not be required to undertake elements of this module that relate to their primary performance interest. Instrumentalists will be required to study an instrument apart from their main performance interest. Outside of these requirements students will pursue one hour of instrumental, dance and song classes per week (3 in all). This will be assessed through performance (50%) and continuous assessment (50%).

Also as part of this module, students will undertake...
ensemble work assessed continuously. Students will be encouraged to develop a creative approach to groupwork as well as to develop the interpersonal and musical skills necessary for the successful function of an ensemble.

This module will be a development of progress made in Practicum 1b.

Rationale and Purpose of the Module: To broaden the base of performance skills of the students to include other instrumental, vocal and dance aspects of the tradition

Syllabus: In this module students will be introduced to the practice of a broad range of instrumental, vocal and dance skills they will otherwise be unfamiliar with. Dancers and singers will not be required to undertake elements of this module that relate to their primary performance interest. Instrumentalists will be required to study an instrument apart from their main performance interest. Outside of these requirements students will pursue one hour of instrumental, dance and song classes per week (3 in all). This will be assessed through performance (50%) and continuous assessment (50%)

Also as part of this module, students will undertake ensemble work assessed continuously. Students will be encouraged to develop a creative approach to groupwork as well as develop the interpersonal and musical skills necessary for the successful function of an ensemble.

This module will be a development of progress made in Practicum 1b, Practicum 2b, Practicum 3b and Practicum 4b.

Rationale and Purpose of the Module: To expose the students to a deeper understanding of the history and nature of the Irish music, song and dance traditions.

Syllabus: This module involves a deeper examination of key issues and moments in the historical development of traditional music and dance practice and their study, particularly relating to the position of the song tradition in the past century, the acquisition of the forms of dance music and the documentation of dance in Ireland.

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

To apply cultural theory to Irish Music and Dance Studies.

Syllabus: The main subject areas to be addressed are Irish Language Song; Repertoires in Irish Traditional Music and Dance Practice; Contemporary Developments in Traditional Instrumental Music and Dance. These are to be addressed using a thematic approach which will engage theoretical areas such as identity, ethnicity, globalisation and the meaning of tradition.

Rationale and Purpose of the Module: To introduce the students to the history and structures (musical and in a wider cultural sense) of traditional Irish music and dance.

Syllabus: Issues addressed in this module will be instrumental and dance style, Irish language song tradition, nineteenth-century collections, contemporary issues, sean-nós and set dancing.

Rationale and Purpose of the Module: The development and completion of a research project in the field of traditional music and /or dance studies.

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
The aim of this course is to provide an understanding of art music and dance that will not only be especially helpful in primary and secondary level teaching contexts but will also introduce students to crucial music-historical concepts and terminology that they will deploy elsewhere.

**MD4032 - CONTEXTUALISING AND VOCATIONAL STUDIES 2**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:**
Contextualizing and Vocational Studies 2: History of Western Art Music and Dance. The aim of this module is to provide an understanding of art music and dance that will not only be especially helpful in primary and secondary level teaching contexts but will also introduce students to crucial music-historical concepts and terminology that they will deploy elsewhere.

**Syllabus:** This course will act as an introduction to the historical development of Western Art Music from its roots in medieval church and secular music to its contemporary forms. Its historical relationship to traditional musics in Europe and beyond will be discussed. Dance traditions will also be explored, referencing classical, neo-classical, contemporary and post-modern dance artists and practices. The course will include the history of dance performance in other locations and environments, for example site specific works, choreography for camera and the influence of new technologies on the development of choreography and performance.

**MD4034 - CONTEXTUALISING AND VOCATIONAL STUDIES 3**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** This module is designed to help competent musicians and dancers to come to an understanding of what it means to be involved in music and dance education contexts.

**Syllabus:** There are three main components: Music and Dance Curriculum studies, Professional Studies and School Based Work. The first priority is to help the development of expertise in a variety of educative situations. These range from classroom activities for various age groups and abilities to instrumental teaching, classroom teaching, ensemble, choral, band and orchestral rehearsals, and the passing on of traditional and/or ethnic and world musics and dance. There is also an introduction to Community Music and Dance which involves the development of acquired skills in a community music and dance context and as community musicians and dancers.

**MD4038 - CONTEXTUALISING AND VOCATIONAL STUDIES 7**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** To introduce the professional disciplines of music psychology and therapy to the students and to develop a vocational project relevant to the potential future professional experience of the student, involving one or a combination of educational, community music / dance, technology, business orientations.

**Syllabus:** In the first part of the module an overview of the principles and research base relating to the psychology and sociology of music and dance will be presented through lectures and seminars; in particular, human responses to music and/or dance in affective, physiological, emotional and psychological domains. Current research relating to dance participation and performance, music listening, music preference, music for relaxation, music and dance in public spaces, responses to participation and observation of dance and ambient music, will be presented and critiqued.

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).

**MD4042 - PERFORMANCE STUDIES 2: RESEARCH METHODS**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** To introduce students to research methods developed within performance studies to facilitate study of the performing arts; to engage with discourse and debate around performance as research and research as performance and to encourage students to develop their own approach to the integration of creative and reflective practices.

**Syllabus:** An introduction to research methods in performance studies including performance ethnography, ethnographic representative, participatory action research, autoethnography, personal narrative and reflexivity, as well as performance-based strategies including vocal and movement improvisation, performance as dialogue and ritual as research.

**MD4044 - TRAVELLER MUSIC STUDIES**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** This module will examine the music traditions of nomadic communities immediate to the Irish experience (ie. Irish, Scottish travellers and Romany Gypsys) but in a wider European context. Students will engage these music cultures in a wide cultural and physical context and develop an understanding of the contribution of these music cultures to those of the afo-called/E settled community. The inclusion of this module will contribute to the mainstreaming of this area to the curricular activities of the Irish World Academy of Performing Arts.

**Syllabus:** Students will study the music traditions of Irish, Scottish travellers and Romany Gypsies. For these communities issues such as Ethnicity, origin, language and Nomadism will be addressed especially as they are manifest through the musical traditions of these communities. The module will also address the historical treatment of these traditions by collectors and musicologists. Case studies will be presented to contextualise these issues addressing the role of the Irish travelling community in the piping, song and fiddle traditions of this island, the song tradition of the Scottish traveller community and its appearance in Ireland and the fusion of Gypsy music with other music cultures across Europe.

**MD4046 - IMPROVISATION AND COMPOSITION (VOICE / MUSIC / DANCE)**
ECTS Credits: 6

**Humanities**

**Rationale and Purpose of the Module:** This module will examine the music traditions of nomadic communities immediate to the Irish experience (ie. Irish, Scottish travellers and Romany Gypsys) but in a wider European context. Students will engage these music cultures in a wide cultural and physical context and develop an understanding of the contribution of these music cultures to those of the afo-called/E settled community. The inclusion of this module will contribute to the mainstreaming of this area to the curricular activities of the Irish World Academy of Performing Arts.
**Humanities**

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

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

**MD4048 - PERFORMANCE STUDIES 6: PERFORMANCE STUDIES SEMINAR / FYP**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** To introduce students to independent research in performance studies through engagement with its primary research journal, TDR: The Journal of Performance Studies, in the form of lecture / seminars, including presentations on relevant articles, performance presentations and the presentation of new research.

**Syllabus:** An engagement with current scholarship in performance studies, primarily through an exploration of relevant articles in TDR: The Performance Studies Journal, as well as engaging in independent research, through scholarship, performance and reflection.

**MD4052 - NATIVE MUSIC AND DANCE TRADITIONS OF IRELAND**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** To introduce the students to the history and structures (musical and in a wider cultural sense) of traditional Irish music and dance.

**Syllabus:** The syllabus is a development of the existing Introduction to Irish Traditional Music and Dance Studies 1 and 2, offered as part of the first year of the BA Irish Music and Dance programme. 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; instrumental and dance style; Irish language song tradition; nineteenth-century collections of Irish traditional music; contemporary issues; sean-nós and set dancing. An important part of this module will be the weekly tutorials in Irish traditional music, giving the students a practical engagement with the tradition.

**MD4062 - SOMATICS AND RITUAL PERFORMANCE 2**

*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:** An introduction to the history of contemporary somatic practices and their various application in arts practice with particular reference to performance, educational, and therapeutic contexts, with particular reference to the somatic practice of Body Mind Centering, in addition students will study historical, cultural and social aspects of ritual practice with specific reference to performance rituals; they will devise new models of performance working under the direction of guest tutors.

**MD4064 - SOMATICS AND RITUAL PERFORMANCE 4**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** 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 performance; it will also provide the opportunity for students to continue to develop skills necessary to explore and develop innovative models for ritualising performance and increase their options for engagement in a range of professional contexts.

**MD4066 - ETHNOMUSICOLOGY AND ETHNOCHOREOLOGY WORLD MUSIC AND DANCE SURVEY / DIGITAL MEDIA TECHNOLOGY**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** 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 performance; it will also provide the opportunity for students to continue to develop skills necessary to explore and develop innovative models for ritualising performance and increase their options for engagement in a range of professional contexts.

**MD4068 - SOMATICS AND RITUAL PERFORMANCE 6**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** 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 performance; it will also provide the opportunity for students to continue to develop skills necessary to explore and develop innovative models for ritualising performance and increase their options for engagement in a range of professional contexts.

**MD4070 - SURVEY / DIGITAL MEDIA TECHNOLOGY**

*ECTS Credits: 6*

**Humanities**

**Rationale and Purpose of the Module:** 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 performance; it will also provide the opportunity for students to continue to develop skills necessary to explore and develop innovative models for ritualising performance and increase their options for engagement in a range of professional contexts.
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 continue to develop their final year project within a specific context and continue to focus on their preferred options for professional practice.

MD4072 - VOICE AND DANCE SKILLS FOR PERFORMANCE 2
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To provide the opportunity for students to engage with range of approaches to the study and practice of dance and voice training techniques in order that they can develop good understanding and foundation for their own practice. The development of a broad base of performance skills together with an understanding of their historical origins will further empower the students in professional performance based contexts.

Syllabus: Students will be required to specialise in voice or dance, and through regular technique classes and workshops students will continue to study and practice the basic technical principles of both western contemporary and world dance and voice traditions; students will study the historical contexts and theoretical frameworks that underpin these techniques and traditions.

MD4074 - VOICE AND DANCE SKILLS FOR PERFORMANCE 4
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: The development of a broad base of performance skills together with an understanding of their historical origins and the ability to analyse movement will provide the students with a depth of understanding which will extend their opportunities for engagement in professional performance based contexts.

Syllabus: Students will be required to specialise in voice or dance, and through regular technique classes and workshops students will continue to study and practice the basic technical principles of both western contemporary and world dance and voice traditions, and to further study methods of analysing movement and sound and methods of reflective practice in order to develop critical awareness of technique training, and will also complement the learning of musical analytical and early notational systems.
Rationale and Purpose of the Module: To provide students with the opportunity to deepen their study and practice voice and dance composition so that they can develop the skills and confidence to work towards the creation of voice and dance compositions in a range of contexts including film and new media and thus broaden their options in performance.

Syllabus: Students will be required to specialise in voice or dance, and study and practice a range of approaches to composition drawn from the repertoire of western, Asian, African and Irish dance traditions; and Gregorian chant, Irish traditional song, western solo and choral, and jazz and pop music traditions, as well as from a new world music repertoire; study the historical and cultural contexts within which these compositional methods and techniques developed; and study and practice skills to create solo and ensemble compositions.

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MD4086 - VOICE AND DANCE SKILLS
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: This module is one of five modules (three new, one existing and one elective from existing modules) put in place to provide the option of a UL based semester six for this programme. Currently there is a compulsory exchange semester that is no longer viable. In this module students will develop the ability to select and design a programme which shows an understanding of technique principles and practices and their application to a specific context will prepare student to develop an informed and intelligent method to sustain their on-going and evolving practice. This will support students to develop a sustainable practice in professional performance based contexts. Students in this module will look to other, less mainstream performance practices available for examination.

Syllabus: Students will be required to specialise in voice or dance, and through regular technique classes and workshops they will continue to study and practice the basic technical principles of both western and world dance and voice traditions, broadening their stylistic experience. They will engage in controlled methods of analysing movement and sound and methods of reflective practice in order to develop critical awareness of technique training. Students will also complement their reading/singing skills through the learning of musical analytical and other notational systems. Students will also complement their choreographic skills through analytical approaches to movement composition.

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MD4087 - ADVANCED ENSEMBLE
ECTS Credits: 6

Humanities

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

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

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MD4088 - REPERTOIRE, IMPROVISATION AND COMPOSITION 6
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To support students to develop the skills to understand and the artistic and technical requirements necessary to develop and produce performances in a range of contexts, this in order to prepare the students for entry into the professional performance contexts and also expand their career options in other aspects of performance including costume, lighting design and stage management, publicity.

Syllabus: Students will be required to specialise in voice or dance, and will work under the direction of guest tutors and the course directors to create and design and produce a number of performance projects, including solo and ensemble works, to be presented in a range of performance contexts featuring the student/EEs own work in addition to the works from the repertoires they have studied.

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MD4094 - MUSIC, LANGUAGE, SIGN AND TEXT
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To develop the student's critical understanding of the relationship of language, signs and symbols to music. This will allow students to engage their academic studies in the field of performing arts in a more critical and informed manner.

Syllabus: In this module students will be introduced to the broad twentieth-century traditions of structuralism, post-structuralism, post-modernism and cognitive linguistics. They will examine the application of theoretical structures from these traditions, in particular those promoted by Saussure, Barthes, Fauconnier, Bakhtin, Kristeva, Lakoff, Turner and Foucault, in the contexts of understanding roles of meaning and the interaction of sign, text and language in musical and musico-sociological contexts. Students will be encouraged to examine these theoretical constructs in the constructs of their own performance practices. Students will be provided with written feedback according to BA Irish Music and Dance policy.

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MD4096 - CONTEMPORARY MUSIC AND DANCE REPERTOIRES
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: This module is one of five modules (three new, one existing and one elective from existing modules) put in place to provide the option of a UL based semester six for this programme. Currently there is a compulsory exchange semester that is no longer viable. This module is to support students to develop the skills to understand and the artistic repertoires from a range of contexts. The students will address a number of repertoires. This diverse engagement is in order to prepare the students for entry into the professional performance contexts and also expand their career options in other aspects of performance.

Syllabus: Students will be required to specialise in voice or dance, and will work under the direction of guest
MD4098 - COMPOSITION AND ARRANGEMENT IN IRISH TRADITIONAL MUSIC 2
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To develop the students' skills and knowledge of composition and arrangement in popular and classical music idioms and apply them in the context of traditional music fusions with these forms.

Syllabus: Students will examine some of the dominant forms of ensemble making in western music today. These will specifically be examined in the context of western art music (in particular string writing) and the contemporary use of studio techniques in popular music culture. Students will develop these skills in lectures, composition and studio laboratories. Assessment will be through continuous assessment in the submission of scores and recordings. Students will be provided with written feedback according to BA Irish Music and Dance policy.

MD4104 - MUSIC THEORY AND PRACTICE SKILLS 1
ECTS Credits: 6

Humanities

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

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

MD4108 - CHOREOGRAPHIC SKILLS 2
ECTS Credits: 6

Rationale and Purpose of the Module: To develop, in the students, an ability to apply the principles of applied mechanics to typical aircraft mechanisms.


Prerequisites: ME4111, ME4112

ME4008 - ORTHOPAEDIC BIOMECHANICS AND MECHANOBIOLOGY
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This module will provide the student with an understanding of the role of mechanics in regulating orthopaedic tissue development and homeostasis at both the organ and cellular level.

Syllabus: Development and structure of bone; Bone biomechanics; Composition and structure of cartilage; Cartilage biomechanics; Structure and mechanics of the ligament and tendon; Computational models in orthopaedic biomechanics; Cell mechanics; Models of cell mechanical behaviour; Cellular mechanotransduction; Bone mechanobiology; Cartilage mechanobiology; Ligament and tendon mechanobiology; Techniques in mechanobiology; Mechanical stimulation of cells; Orthopaedic tissue engineering; Bioreactors in Tissue Engineering;

ME4101 - AIRCRAFT MECHANICS
ECTS Credits: 3

School of Engineering

Rationale and Purpose of the Module: To develop, in the students, an ability to apply the principles of applied mechanics to typical aircraft mechanisms.


Prerequisites: ME4111, ME4112

ME4112 - ENGINEERING MECHANICS 2
ECTS Credits: 6
School of Engineering

**ME4116 - AIRCRAFT VIBRATIONS**
ECTS Credits: 6

**School of Engineering**

Rationale and Purpose of the Module: To provide an appreciation of the critical design issues associated with vibrations in structures and devices, with an emphasis on applications in aircraft. To enable students to analyse vibrational problems with standard mathematical tools for linear systems, and design simple vibration absorption and isolation systems.

**Syllabus:** Oscillatory motion; free vibration of single degree of freedom systems; harmonically excited vibration; transient vibration; vibrations under general forcing conditions; systems with two or more degrees of freedom; modal analysis; introduction to aeroelasticity.

Prerequisites: ME4111

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**ME4226 - MECHANICS OF SOLIDS 2**
ECTS Credits: 6

**School of Engineering**

Rationale and Purpose of the Module: To understand and analyse and measure the state of strain at a point in a 2D strain field. To analyse stresses and deformation in circular plates under symmetrical loading. To be able to determine yielding under multiaxial loading. To be able to predict the maximum deflection of a beam subjected to simple and complex loading in a plane. To predict the buckling load and maximum stress in a strut. To understand the factors influencing fatigue life and be able to predict the life of simple engineering components. To understand the basics of LEFM. To analyse the stresses in beams of unsymmetrical section.

**Syllabus:** Infinitesimal strain at a point in a 2D stress field and Mohr’s strain circle. Selection of strain gauges for measurement on metals. Thin circular plates. Criteria of failure for isotropic homogeneous materials (Rankine, Tresca and Von Mises). Deflection of beams. Buckling of struts (Euler and Rankine-Gordon). LEFM. Fatigue. Unsymmetrical bending.

Prerequisites: ME4213

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**ME4308 - BIOMATERIALS 2**
ECTS Credits: 6

**School of Engineering**

Rationale and Purpose of the Module: To gain appreciation for hard tissue replacement materials in current use; To enable students to understand material selection and design criteria for hard tissue replacement applications; Gain understanding of regulatory environment.

**Syllabus:** Materials for hard tissue orthopaedic applications; survey of applications (TJR, substitution, fixation) alloys bone cements, substitutes (bioactive and resorbable). Dental implant applications and materials Dental restorative materials Regulatory affairs: 93/42/EEC, MDD, FDA, EN46000, AIMDD, IVDD and related standards.

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**ME4328 - AIRCRAFT MAINTENANCE**
ECTS Credits: 3

**School of Engineering**

Rationale and Purpose of the Module: To familiarise the students with the regulatory framework and engineering context to the safe operation of commercial heavy and light aircraft from a design and MRO perspective.

**Syllabus:** Aircraft maintenance; philosophy of maintenance, inspection schedules, EASA regulatory requirements, condition monitoring, original equipment manufacturer/Es (OEM) recommendations, management of materials, durability and reliability of materials and components, replacement decisions, traceability of materials and components and ageing aircraft programmes. Introduction to the failure effects and reliability analysis of aircraft systems. Aircraft repair and inspection: causes and mechanisms of corrosion including galvanic, pitting, fretting and stress corrosion; design, control and maintenance practices for improving resistance to corrosion, non destructive testing (NDT) techniques and procedures, general inspection procedures; analysis and design of repair procedures for both metallic and composite structures.
ME4412 - FLUID MECHANICS 1  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To introduce the nature of fluids, the dynamic behavior of fluids and application of the principles of continuity, energy and momentum to viscous fluid flow.


Prerequisites: ME4412

ME4414 - FLUIDS MECHANICS 2  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To apply the principle of Continuity, Energy and Momentum covered in Fluid Mechanics 1 to dimensional analysis and similarity, viscous flow, inviscid flow, circular motion, hydraulic machines and compressible flow.

Syllabus: Dimensional analysis and dynamic similarity with applications; inviscid flow theory and applications; vortex motion; analysis and performance evaluation of turbines, fans and pumps; selection of hydraulic machines from specific property requirements; Navier-Stokes equations with applications, lubrication theory; compressible flow. Channel flow.

Prerequisites: ME4412

ME4416 - THERMODYNAMICS 2  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide an understanding of the mode of operation for actual heat pump and refrigeration systems and to analyse their performance characteristics. To provide an understanding of the mode of operation of Rankine, superheat, reheate and regenerative steam power cycles and to analyse their performance characteristics. To analyse the power output characteristics of pure impulse turbines and impulse-reaction axial flow turbines. To relate the performance and characteristics of the latter to steam enthalpy change in multi-stage operation. To analyse the power input requirements, volumetric efficiency and heat loss characteristics for single stage and multi-stage compressors. To provide an understanding of the mode of operation for actual 2-stroke and 4-stroke spark ignition and compression ignition engines and to analyse their performance characteristics with reference to mean effective pressure, indicated power, brake power, specific fuel consumption, volumetric efficiency, thermal efficiency and heat loss characteristics.


Prerequisites: ME4412

ME4417 - BOUNDARY LAYER THEORY  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To advance the knowledge of the students of fluid flow, aerodynamics and convective heat transfer


Prerequisites: ME4412

ME4526 - INTRODUCTION TO HEAT TRANSFER  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide a basis to students in the concepts and solution methods of conduction, convection and radiative heat transfer, and the measurement techniques utilised in heat transfer


Prerequisites: ME4412

ME4528 - PROPULSION SYSTEMS  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide students with fundamental knowledge about aircraft propulsion systems, particularly the air-breathing jet engine. Students should attain understanding of the thermodynamics and mechanics of the engine as a whole as well as individual components.
Rationale and Purpose of the Module: To give students a practical overview of industrial control systems, and their application to discrete part manufacturing, batch and continuous processes, and to provide specific exposure to the application of Programmable Logic Controllers in manufacturing and process environments.

Syllabus: * Introduction to control systems and automation  
* Programmable Controller’s hardware and software.  
* Control program development.  
* Sequential control.  
* Interfacing external devices.  
* PLC Communications.  
* PLC Applications.  
* Selection, installation and commissioning of PLC systems.  
* Supervisory computer control.  
* Sampling and filtering of continuous measurements.

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**ME4736 - PHYSIOLOGICAL FLUID MECHANICS 1**  
ECTS Credits: 6

School of Engineering  

Rationale and Purpose of the Module: To introduce the students to the field of physiological fluid mechanics, develop their knowledge of physiological fluid flows including airflow, blood flow and urology, study these flows in straight, rigid and compliant tubes and examine transport phenomena in biological systems, viscous flow, inviscid flow.

Syllabus: Viscous and inviscid flow theory and applications. The role of transport phenomena in biological systems and the definition of these processes, including momentum, convection, diffusion and binding interactions. Introduction to the primary physiological convective transport systems: cardiovascular system, respiratory system, urological and lymph systems. Properties of physiological fluids and constitutive relations; Newton’s law of viscosity, non-Newtonian rheology and time dependent viscoelastic behaviour. The derivation of the conservation relations for fluid transport, dimensional analysis and scaling. Introduction to Mass Transfer, Ficks law of diffusion. Transport of Gases between blood and tissues: oxygen-haemoglobin equilibria and the dynamics of oxygenation of blood in lung capillaries.

Prerequisites: ME4412

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**ME4746 - PHYSIOLOGICAL FLUID MECHANICS 2**  
ECTS Credits: 6

School of Engineering  

Rationale and Purpose of the Module: To advance the knowledge of students physiological fluid mechanics; specifically introducing concepts and applications in mass transport and heat transport.


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**ME4718 - FLUID PROCESS CONTROL**  
ECTS Credits: 6

School of Engineering  

Rationale and Purpose of the Module: To develop an understanding of the underlying concepts of FEA. To be able to apply the method to problems in solid mechanics and heat transfer.


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**ME4616 - FINITE ELEMENT ANALYSIS**  
ECTS Credits: 6

School of Engineering  

Rationale and Purpose of the Module: An overview of propulsion systems and the development of thrust. A review of the conservation equations of fluid mechanics. The thrust equation. Propulsion efficiencies and implications for system design. A review of compressible fluid flow covering isentropic flow through ducts, constant area heat transfer and shock wave formation. The thermodynamic design of air-breathing engines covering the ramjet, the turbojet, the turbofan and the turboprop. Typical engine performance and aircraft matching. Detailed aerothermodynamic design of intakes, combustion chambers and exhaust nozzles. Detailed internal design of compressors and turbines covering two-dimensional blade row velocity diagrams, boundary layer flow and performance limitations.
School of Engineering

Rationale and Purpose of the Module: To expose the student to the practical application of design, materials, mechanics and strength of materials theory. The work will focus on the appropriate use of Standards, Charts and Design Guides illustrating the oft times empirical nature of applied engineering tasks. Underpinning each topic will be constant reference to the evolution of the practices and their relationship to current theory. In particular, there will be constant reference to the life and reliability to be expected from solutions.


ME5012 - FINITE ELEMENT ANALYSIS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To develop an understanding of the underlying concepts of FEA. To be able to apply the method to problems in solid mechanics and heat transfer.


ME6032 - ADVANCED AIRCRAFT STRUCTURES
ECTS Credits: 6

School of Engineering

Syllabus:

Mechanical structures and their loadings. Aeroelasticity: Load distribution and divergence, control effectiveness and reversal, introduction to flutter. Structural and loading discontinuities: shear stress distribution in beams; shear lag. Structural Stability: Unstable behaviour; beam columns; slender column buckling; column imperfections and load misalignment; inelastic buckling; Approximate methods; thin plate buckling; crippling stresses. Crashworthiness: Bird strike on aircraft, hard debris/hail impact, certification.

Composite Structures: Bolted composite joints; stresses in open hole and filled hole coupons, single/double lap joints, multi-bolt joints, load distribution, bearing/bypass stresses, joint failure; bonded joints; thin walled composite beams.


ME602 - FRACTURE MECHANICS
ECTS Credits: 6

School of Engineering

Definition of strain energy density, strain energy, energy release rate and compliance. Determination of elastic crack tip K field. Definition and use of crack opening displacement COD. Determination of K in infinite and finite bodies. Concept of K dominance, KIC testing, relationship between K and energy release rate. Concept of cleavage fracture. Examination of fracture under mixed mode conditions and crack branching.


ME6072 - ENGINEERING MECHANICS OF PLASTICS AND COMPOSITES
ECTS Credits: 6

School of Engineering

Provide the foundations for analysing stress and strain in Polymers and Composite Materials. Identify how to use physical and mathematical models to describe the stress/strain response of polymers over time creep, relaxation and recovery. The fatigue, fracture and creep rupture of plastics. Introductory concept of micromechanics to estimate the elastic constants of a unidirectional orthotropic composite. Experimental measurement of principal strains on an orthotropic composite coupon. Hierarchy of deformation processes for sheet-forming of composite component: Resin flow, Transverse flow, Interply slip and Intraply shear. Rheology including resin viscosity/fibre suspensions and infusion processing window dependency on
ME6092 - RENEWABLE ENERGY TECHNOLOGIES  
ECTS Credits: 6  
School of Engineering  
Rationale and Purpose of the Module: To provide students with knowledge of renewable energy technologies.  
Syllabus: From the following Renewable Energy topics, 3 areas will be addressed in detail each year  
Topics: Wind Turbines, Solar, Hydro, Wave, Tidal, Geothermal, Biomass, Fuel Cell  
Hydro Power: Introduction; Principles; Assessing the resources for small installations; An Impulse Turbine; Reaction Turbine; Hydroelectric systems; Social and environmental aspect  
Biomass: Processes for the use of biomass: Drying, Gasification, Fluidized Beds; Feedstock/Fuel: Particle characterisation, Flow through packed Beds, Carmen-Koseny equation, Ergun equation, Geldart classification, Grace-Reh diagram; Fluidization: flow through fluidized beds, minimum fluidizing velocity, regimes of fluidization; Elutriation of fine particles and pneumatic transport.  
Wind Power: Wind Characteristics and Resources; Aerodynamics of Wind Turbines: Momentum theory and the Betz limit, Horizontal Axis Wind Turbine, Aerofoils, Blade element theory, Effect of drag and blade number on optimum design; Wind Turbine rotor dynamics; Wind Turbine Design: Topologies, Materials, Machine Elements, Wind Turbine loads, Design Evaluation, Powel Curve Prediction; Wind Turbine Control; Wind Turbine Siting; Wind Energy System Economics; Environmental Aspects and Impacts of Wind Energy Systems  
Wave Power: Introduction, principle of wave motion, wave energy, power and resources, wave patterns, wave conversion devices, social and environmental aspect.  
Tidal Power: Introduction, the cause of tided, enhancement of tides; tidal current/stream power, tidal range power, world range power sites, social and environmental aspect of tidal power, Geothermal: Physics of geothermal resources; Technologies: Steam power plants, Ground source heat pumps, Hot dry rock technology; Environmental Implications & Economic potential; Geothermal Energy in Ireland ground temperatures, soil types.  
Electricity Generation Photovoltaic: Semiconductors and Doping, Monocrystalline silicon cells, Polycrystalline silicon, electrical characteristics of PV, remote power, grid connected PV systems, cost of PV, environmental impact & safety  

ME6122 - MICROFLUIDICS  
ECTS Credits: 6  
School of Engineering  
Rationale and Purpose of the Module: To provide the students with an understanding of the main theoretical concepts, measurement and manufacturing methodologies for microfluidic devices.  
Syllabus: Relevance of microfluidics in Lab-on-a-Chip, BioMEMs and Process Intensification  
Scale effects on mass, momentum and thermal transport  
Poiseuille flow in rectangular channels, developing microflows, prediction using hydraulic resistance, slip effects in gaseous flows (1st and Deissler 2nd Order), Tangential Accommodation Coefficients  
Measurement Techniques (Pressure, Flow, Velocity, Mass Transport, Temperature)  
Introduction to Microfabrication Techniques for microfluidic devices (DRIE, Stereolithography, Embossing etc.)

MF4733 - MANUFACTURING INFORMATION SYSTEMS  
ECTS Credits: 6  
School of Engineering  
Rationale and Purpose of the Module: The development of large-scale complex manufacturing 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 manufacturing performance-oriented approaches to system specification.  
Syllabus: - Software lifecycles: review of the waterfall model, prototyping, spiral, and object-oriented (OO) development models.  
- Focus on understanding the Unified Enterprise.  
- Characteristics of good software design - modules, cohesion, coupling or dependency, encapsulation, abstraction, etc.  
- Requirements investigation.  
- Requirements classification: functional and non-functional requirements.  
- Entity Relationship Modelling, Requirements Engineering: use case diagrams and use case descriptions.  
- Relational Database Design and Development.  
- Other methodologies - DSDM, Agile approaches, Extreme Programming.  
Integration with, and data capture from, metrology equipment and bar-code readers. Interfacing with, and control of, stepping motors and programmable logic controllers. Use of application program libraries and integration with other software applications. File format conversion between computer aided design, manufacturing systems and other Manufacturing applications, eg. Shop floor data acquisition systems.

MF4756 - PRODUCT DESIGN AND MODELLING  
ECTS Credits: 6
Management and Marketing

Rationale and Purpose of the Module: To provide students with an understanding of the role and importance of strategy in contemporary organisations. To enable students to develop strategic thinking and problem-solving skills.

Syllabus: Multi-perspective nature of strategy, strategic dimensions, strategies, theories of business level competitive advantage - market positioning, resource-based and the dynamic capabilities approach. Strategic options and decision making, implementation issues: resource allocation, stakeholder management, strategic control, and change management. Strategic cultures and paradigms, the role of the strategist. Corporate-level strategy, multi-business structures and coherence, Organisational and Environmental Turbulence, Scenario Planning and future thinking.

MG4058 - MANAGEMENT CONSULTING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: To provide students with an understanding of the role and importance of strategy in contemporary organisations. To enable students to develop strategic thinking and problem-solving skills.

Syllabus: Problem definition and clarification - design briefs; New Product Development (NPD) Concurrent Engineering NPD vs Traditional NPD; The deliverables of processes of design; design processes and the role of parametric CAD; Modelling strategies from cognition to prototype; Creative Design Methods; Product Concepts; Surface modelling and solid modelling techniques; design intent: planning parts for design flexibility; relations and equations; parametric dimensions; design and modelling for manufacture and assembly; assembly modelling; drawings; drawing documentation; BOMs; creating design tables using Excel for multiple part and assembly configurations; Library features: SolidWorks Toolbox of fasteners and components; importing and exporting files; CAD standards for data exchange; STL files and the FDM rapid prototyping system; linking with SolidCAM; FEA analysis and design validation; rendering and presentation techniques; product animation.

Prerequisites: MF4722

MG4037 - STRATEGIC MANAGEMENT
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: To provide students with a significant understanding of the role and importance of strategic management in contemporary organisations.

Syllabus: Multi-perspective nature of strategy, strategic dimensions, strategy processes, theories of business level competitive advantage - market positioning, resource-based and the dynamic capabilities approach. Strategic options and decision making, implementation issues: resource allocation, stakeholder management, strategic control, and change management. Strategic cultures and paradigms, the role of the strategist. Corporate-level strategy, multi-business structures and coherence, Organisational and Environmental Turbulence, Scenario Planning and future thinking.

MG4604 - AIR TRANSPORTATION
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: To provide students with an appreciation and analysis of the air transport industry structure, competition, technical and commercial issues facing companies involved in the sector, complimenting existing knowledge of aeronautical engineering.

Syllabus: Overview of the international aviation industry including air transport, airports, aerospace manufacturing, maintenance and other aviation services. History of aviation including the development of national and international regulations of civil aviation. The advent of deregulation and liberalization of air transport markets to produce open skies. The characteristics of airline operations, airline costs, passenger demand, marketing strategies and pricing fare policies. The use of gantt charts, bills of material (BOM) and the principles of FIFO within the air transport sector. Air transport in Ireland and the current international air transport industry structure, competition, emerging trends and future prospects.
knowledge codification; the transfer of knowledge at an individual, group, organizational and inter-organizational level; cross cultural knowledge management; changing use of systems due to knowledge intensity; communities of knowing; implications for knowledge systems in support of non-traditional/emerging organizational structures. The above concepts will be reinforced and developed through the use of various software packages including web, intranet and knowledge portal software systems.

Prerequisites: MT4407

MK4002 - MARKETING
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This module is designed to introduce students to the philosophy and historical underpinnings of marketing. As such, it will help students to position marketing both as an organisational discipline and as a societal force. The module will trace the development of marketing as a business philosophy and will assess the role of marketing within the international business organisation. Students will also explore what it means for organisations to be market-led. Finally, the module will delineate the rights and responsibilities of marketers and customers, and identify the role and impact of marketing in society.

Syllabus: The syllabus provides coverage of the nature of marketing and, in particular, offers an historical backdrop to the development of the discipline. Next, students are introduced to the cornerstones of marketing in the discipline in the guise of the marketing concept and the marketing mix. Issues relating to marketing as organisational culture are considered with specific reference to marketing orientation and the barriers to developing such an orientation. The process of marketing in different contexts (service, industrial, international etc.) is discussed and differences highlighted. The consumer is introduced as the core target of marketing activity and relevant issues such as consumer sovereignty; consumer rights and the consumer movement are debated. On a macro level, issues relating to social responsibility and ethics are delineated. Finally, the module addresses the thorny issue of how marketing adds value and what its contribution might be.

Prerequisites: MK4002

MK4004 - CONSUMPTION AND CONSUMER CULTURE
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This course aims to provide coverage of the nature of consumer culture.

* To reflect the general shift within consumer culture in the basic emphasis of economic systems from exchange or production to consumption.
* To define the domain of consumer behaviour, including some areas of interest to consumer behaviour researchers, policymakers, and marketers.
* To provide coverage of the circle of consumption and how consumption relates to other technological and economic processes.
* To explore contemporary theories of consumption.
* To encourage students to critically reflect upon their own consumption.

Syllabus: The Circle of Consumption; Motivational Dynamics; Culture; Cultural Values; Myths & Symbols; Cultural Rituals; Types of Meanings; Meaning Transfer; Strategic Analysis of Consumers; Self Concept; Subcultures of Consumption; Lifestyles; Embodiment & Consumption; Classic Theories of Motivation; Consumer Motives in Cultural Perspective; Involvement; Consumer Experience; Consumer Learning; Purchasing; Gift Exchange; Organisational Consumption; Family & Household Consumption; The Social Context of Personal Consumption; Tools of Influence; Reference Groups; Innovation; Adoption and Diffusion; Resistance; Compulsive Consumption; The Disposition Process; Profiles of Disposition Behaviours; Factors Affecting Disposal Choices.

Prerequisites: MK4002

MK4006 - MARKETING MANAGEMENT (NON BUSINESS)
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: This module will provide non business students with an understanding of the key knowledge and skills involved in marketing management. The module will examine the strategic importance of marketing and explore the key challenges and contemporary issues surrounding the management of marketing.

The key objectives are:
1. To explore the role of marketing management in the contemporary environment and investigate how marketers can manage environmental changes.
2. To evaluate marketing contributions in the creation of sustainable competitive advantage for different business contexts.
3. To investigate the importance of marketing within the firm and the challenges surrounding the management of the marketing function.
4. To provide students with an understanding of the role of marketing planning and implementation.

Syllabus: Building upon the foundations of marketing, this module takes a strategic approach to the theory and practice of marketing. The module introduces the concept of the marketing vision and explores the process of strategic analysis based on an assessment of key external and internal forces affecting the firm. An exploration of marketing strategy and the sources of competitive advantage follow with key competitive positioning strategies presented. The module focuses on understanding the management of the marketing function, the development of the marketing mix and the practice of marketing in terms of maximising value to customers and other stakeholders. Core areas to marketing management such as customer behaviour, brand management, services management and relationship marketing are examined. Key models and theories related to marketing planning and implementation are explored.

Prerequisites: MK4603

MK4008 - APPLIED MARKETING 2
ECTS Credits: 6

Management and Marketing

Rationale and Purpose of the Module: The emphasis of this module will be the development of planning, implementation and communication skills. To foster an ability to produce effective customer communications through a range of media. To enhance oral and written marketing communication skills.

Syllabus: Developing an Integrated Marketing Communications Plan, Developing a Creative Brief,

Rationale and Purpose of the Module:
The Psychology of selling strategy including CRM.

1. To introduce relational approaches to marketing.
2. To understand the nature and importance of interaction in service, intra-organisational and mass marketing contexts.
3. To understand the process of relationship development and to appreciate relationship success variables and how they might be fostered.
4. To consider approaches to relationship management including CRM.

5. To understand competitive and collaborative networks and the strategic implications for individual organisations.
6. To appreciate the implications of marketing when viewed as interaction, relationships and networks.


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MK4014 - BRANDING
ECTS Credits: 6
Management and Marketing
The syllabus presents, in the first instance, a review of the history and origins of branding. This provides context for the subsequent discussion of the role and importance of branding. Next, students are introduced to the processes of segmentation, targeting and positioning. Brand building activities are reviewed with consideration given to strategic brand management, comparative analyses of brand image and brand concept, and an exploration of brands as assets. Finally, branding is discussed in terms of how it relates to different marketing contexts: service brands; industrial brands; retailer brands; international brands and corporate brands.

Prerequisites: MK4002

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MK4018 - INTERACTION, RELATIONSHIPS AND NETWORKS
ECTS Credits: 6
Management and Marketing
Rationale and Purpose of the Module: 1. To introduce relational approaches to marketing. 2. To understand the nature and importance of interaction in service, intra-organisational and mass marketing contexts. 3. To understand the process of relationships development and to appreciate relationship success variables and how they might be fostered. 4. To consider approaches to relationship management including CRM.

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MS4014 - INTRODUCTION TO NUMERICAL ANALYSIS
ECTS Credits: 6
Mathematics & Statistics
Rationale and Purpose of the Module: This module provides an introduction to the basic concepts of numerical analysis.

Syllabus: Propagation of floating point error;
Zeros of nonlinear functions: Bisection method, Newton/Es method, Secant method, fixed point method; convergence criteria, rate of convergence, effect of multiplicity of zero; introduction to the use of Newton/Es method for systems of nonlinear equations.

Systems of linear equations: Gauss elimination, LU and Cholesky factorisation, ill-conditioning, condition number; iterative methods: Jacobi, Gauss-Seidel, SOR, convergence criterion.

Interpolation and Quadrature: Lagrange interpolation, error formula;
Newton-Cotes and Romberg quadrature.


Prerequisites: MS4022, MS4403

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MS4018 - DYNAMICAL SYSTEMS
ECTS Credits: 6
Mathematics & Statistics
Rationale and Purpose of the Module: To demonstrate to the student how dynamical techniques can be applied to the analysis of nonlinear and chaotic models, data and systems.

Syllabus: One dimensional flows: flows on the line, fixed points and stability; bifurcations, flows on the circle.


Chaos : Lorenz equations; strange attractors; control of chaos.

One dimensional maps : fixed points, periodic points and stability; bifurcations, the logistic map -- numerics and analysis, period-doubling and intermittency; Lyapunov exponents, renormalisation and Feigenbaum numbers.

Introduction to time series applications.
Fractals : dimensions; strange attractors revisited.

Prerequisites: MS4403

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MS4022 - CALCULUS 2
ECTS Credits: 6
Mathematics & Statistics
Rationale and Purpose of the Module: This module introduces the student to sequences and series, integral calculus, ordinary differential equations and functions of several variables. It develops problem solving skills in these topics.

Syllabus: Sequences and series: Limit of a sequence, convergence of a sequence; series, convergence, tests for convergence, absolute and conditional convergence. Power series.
- MacLaurin and Taylor series: Order notation, big-O, little-O notation, asymptotic equivalence, Taylor's Theorem and remainders, applications.

- Indefinite Integral: Integration of standard functions, techniques including integration by parts, substitution and partial fractions.

- Definite Integral: The limit of a Riemann sum, fundamental theorem of calculus, Area between two curves, Volumes of revolution, Improper integrals.

- Introduction to ordinary differential equations: Definition of an ODE, linearity, first order variables separable, solution technique by integration.

- Introduction to functions of two real variables: Continuity, partial derivatives and their geometrical interpretation, Leibniz's rule, conditions (without proof) for maximum, minimum, saddle-point.

Prerequisites: MS4213, MS4217

MS4034 - APPLIED DATA ANALYSIS
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: [Module replaces Numerical Computation MS4024]

This is a new module the aim of which is to give the students experience building and using statistical models to analyse real data and formulate conclusions based on interval estimates, hypothesis testing, model selection and comparison.

The module serves to integrate the practice and theory of statistics.

The instructor and students are expected to analyse the data provided with each lab in order to answer a scientific question posed by the original researchers who collected the data.

To answer a question, statistical methods are introduced, and the mathematical statistics underlying these methods are developed.

Syllabus: Descriptive statistics; quantile plots, normal approximation.

Simple random sampling; confidence intervals.

Stratified sampling; parametric bootstrap allocation.

Estimation and testing; goodness-of-fit tests, information, asymptotic variance.

Contingency tables; experimental design.

Poisson counts and rates; Mantel-Haenszel test.

Regression; prediction, replicate measurements, transformations, inverse regression, weighted regression.

Multiple linear regression; model checking, projections.

Analysis of variance; unbalanced designs, indicator variables, factorial designs.

Prerequisites: MS4222

MS4111 - DISCRETE MATHEMATICS 1
ECTS Credits: 6
Mathematics & Statistics

Rationale and Purpose of the Module: The aim of this module is to introduce students to some of the language of Discrete Mathematics, and to show its relevance, particularly in the context of Computer Science. It is taught at a level that is appropriate to first year students, i.e. without an excess of formality. The module should re-inforce the development of the students "thinking" skills, and should enable them to undertake further study in the various applied areas of Discrete Mathematics (coding, graphs, logic and formal systems etc)

Syllabus: Review of sets and operations on sets, power sets.

Propositional logic, truth tables, propositional calculus, equivalence.

Predicate logic, quantifiers, equivalence, application to (mathematical) proof.

Cartesian product of sets, relations, equivalence relations, matrix representation of relations, composition of relations, functions, types of functions.

Number systems, natural numbers, integers, rationals, reals, axioms for N, proof by induction, recursive definitions and algorithms, recurrence relations.
MS4131 - CONSUMER BEHAVIOUR AND MARKETING RESEARCH
ECTS Credits: 6

Rationale and Purpose of the Module: This module introduces students to the statistical basis behind model identification and model criticism of time series probability models in both time and frequency domains.

Syllabus: Components of a time series; smoothing methods; trend projection; deseasonalising a time series, autocorrelation; autoregressive models; integrated models; estimation in the time domain; the Box-Jenkins approach; spectral analysis, the spectral distribution function, the spectral density function, Fourier analysis, periodogram analysis, the fast Fourier transform; forecasting methods, extrapolation, Holt-Winters, Box-Jenkins, prediction theory; bivariate processes, the cross-correlation function, the cross-spectrum; applied time series analysis using suitable software packages.

MS4132 - FURTHER LINEAR ALGEBRA
ECTS Credits: 6

Mathematics & Statistics
Rationale and Purpose of the Module: Course re-structuring in response to Project Maths.

The aim of this module is to build the student's understanding of Linear Algebra to a more advanced level. The module includes a formal treatment of Vector Spaces and Inner Product Spaces followed by a careful treatment of the properties of vectors and matrices on \( \mathbb{R}^n \) and \( \mathbb{C}^n \).

Syllabus: Axiomatic treatment of Vector Spaces and Inner Product Spaces.
- Linear Independence, spanning sets.
- Bases & Dimension.
- Inner products/norms.
- Angles/orthogonality in Inner Product Spaces.
- Orthonormal bases/Gram Schmidt Orthogonalisation.
- Linear transformations/change of basis.

Properties of matrices.
- Rank, row space, column space, null space.
- Vector norms on \( \mathbb{R}^n \) and \( \mathbb{C}^n \).
- Existence and uniqueness of matrix inverse/relation to matrix rank.
- Fredholm Alternative.
- Unitary and Hermitian properties of matrices.

Eigenvalue & Eigenvector Topics.
- Eigenvalue decomposition for Hermitian matrices.
- Algebraic & Geometric Multiplicity.
- Defective Eigenvalues and Matrices.
- Similarity Transformations.
- Diagonalisation/Unitary Diagonalisation.

Induced matrix norms.

Applications of the above topics.

Prerequisites: MS4131

MS418 - TIME SERIES ANALYSIS
ECTS Credits: 6

Mathematics & Statistics
Rationale and Purpose of the Module: This course introduces students to the statistical basis behind model identification, model fitting and model criticism of time series probability models in both time and frequency domains.

Syllabus: Components of a time series; smoothing methods; trend projection; deseasonalising a time series, autocorrelation; autoregressive models; integrated models; estimation in the time domain; the Box-Jenkins approach; spectral analysis, the spectral distribution function, the spectral density function, Fourier analysis, periodogram analysis, the fast Fourier transform; forecasting methods, extrapolation, Holt-Winters, Box-Jenkins, prediction theory; bivariate processes, the cross-correlation function, the cross-spectrum; applied time series analysis using suitable software packages.

MS4222 - INTRODUCTION TO PROBABILITY AND STATISTICS
ECTS Credits: 6

Mathematics & Statistics
Rationale and Purpose of the Module: This course replaces existing module MS4212 Introduction to Data Analysis. The focus of the previous module MS4212 was the analysis of data without a formal background in probability. The philosophy underpinning this approach was to introduce students to real data, which was entirely absent from Leaving Certificate mathematics in the 1990s, and begin to lay the foundations for the elements of data modelling necessary for the years three and four modules in the statistics options. Probability and Statistics account for 20% of the new Project Maths syllabus. Students now entering first year have had prior exposure to elementary data handling skills and experience applying the some basic ideas of probability. Consequently, it is not obvious that it is still necessary or desirable to adopt a teaching approach that separates the subject areas statistics and probability. As things stand, probability is totally absent from MS4212. One consequence of this omission is that statistical tools are introduced without proper formal theoretical justification based on probability models. Likewise, students are not as well prepared as they could be for the (rather packed) follow-on module MS4213. The intention in the revised (and renamed) first year introductory module is to include some probability in the syllabus. The strategy is to give students time to explore some of the many classical/famous problems that often arise in introductory probability. Discrete random variables and probability mass functions will be covered. As well as relieving some of the pressure in the congested semester 3 module MS4213, students will now be required to engage in more algebraic manipulation and basic mathematics. The statistical content of the module has been reconfigured to allow the inclusion of the material on probability.

Syllabus: Elementary Probability: permutations and combinations; axioms, rules of probability; conditional probability; independent events; probability trees; law of total probability; Bayes' rule.

Discrete Random Variables: probability mass functions (Bernoulli, binomial, Poisson, geometric); expected value, variance; Poisson approximation to the binomial; law of total expectation (discrete form).

The Normal Curve: the normal curve as an idealised histogram; areas under the normal curve; normal probability plot; illustrating the sampling distribution of the mean through applications in statistical quality control; precision of an estimate; the foundations of hypothesis testing and confidence intervals.

Gathering Data: sample surveys; designed experiments and observational studies; randomized control trials. Exploratory Data Analysis: frequencies; histogram; empirical density curve; percentiles; measures of centre; measures of spread; outliers; boxplots; scatterplots; correlation; contingency tables; Simpson's Paradox.

Regression Models: least squares line; transforming to linearity; out-of-sample prediction.

MS4303 - OPERATIONS RESEARCH 1
ECTS Credits: 6

Mathematics & Statistics
Rationale and Purpose of the Module: The module will introduce OR and various standard techniques for decision-making. Linear programming will be covered in some depth. The student will be able to apply these
Syllabus: Model building and the methods of operational research.

Linear programming - graphical interpretation, simplex method and sensitivity analysis. Duality and the dual simplex method,

Applications of linear programming - Transportation and assignment algorithms, zero-sum games.

Critical path analysis - minimum completion time, resource constraints and resource levelling, probabilistic task durations.

Decision analysis - decision trees, expected value, utility, Bayesian approach.

Prerequisites: MS4213

MS4327 - OPTIMISATION
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To give students a broad understanding of the theoretical and numerical aspects of non-linear optimisation


Unconstrained Optimisation. Univariate Functions: Line Searches.


The module will include at least one computer-based project requiring students to select and implement a suitable algorithm for the solution of a non-trivial optimisation problem using either Fortran or Matlab.

MS4404 - PARTIAL DIFFERENTIAL EQUATIONS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce the partial differential equations of applied mathematics and physics with some standard solutions and applications.

To introduce the theory and applications of first order linear and nonlinear partial differential equations of mathematical physics.

Syllabus: [Introduction to PDEs:] Introduction to the partial differential equation of physics; classification of second order linear partial differential equations (hyperbolic, parabolic, elliptic).

[Wave equation:] Derivation of wave equation for strings and membranes; solutions by separation of variables; harmonics; d'Alembert's solution; applications to light and sound.

[Laplace's equation:] steady state heat flow; cylindrically symmetric solutions and Bessel functions; spherically symmetric solutions and Legendre functions; flow in porous media.

[Diffusion equation:] Derivation of heat/diffusion equations in one dimension; relation to Brownian motion (random walk) in two and three dimensions; application to chemical diffusion; solutions by separation of variables.

[First order PDEs:] Linear and quasilinear first order partial differential equations; characteristics; applications in chromatography, glacial flow, sedimentation; breaking waves and shocks; diffusion and dispersion (Burger's and KdV equations).

Prerequisites: MS4403

MS4408 - MATHEMATICAL MODELLING
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To learn the techniques of advanced mathematical modeling or real phenomena with examples from the physical, biological, chemical and financial sciences.

Syllabus: Review of modelling skills, applications from: classical models (e.g. heat transfer), continuum models, financial models, statistical models, mathematical biology, advanced models.

Prerequisites: MS4404, MS4407, MS4403

MS4414 - THEORETICAL MECHANICS
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: To introduce students to the fundamental concepts of theoretical mechanics.

To prepare students by developing the basic mathematical skills in theoretical mechanics.

To emphasise applications of vector calculus and ODEs.

Syllabus: Kinematics: reference frames, motion in one dimension, motion with constant acceleration, kinematics in three dimensions, uniform circular motion, centripetal acceleration.


Conservation laws: momentum, angular momentum, energy (kinetic energy, potential energy as gradient of force).

Oscillatory motion: free and forced pendulum, resonance, parametric resonance.

Introduction to the Hamiltonian and Lagrangian mechanics.

Prerequisites: MS4403, MS4613

MS4528 - MATHEMATICAL AND STATISTICAL
MODELS OF INVESTMENTS  
ECTS Credits: 6

Mathematics & Statistics

Rationale and Purpose of the Module: The aim of this module is to equip the student with the necessary analytical and quantitative skills required for the pricing of interest rate products, credit default swaps, as well as to analyse the risk and return of individual assets and portfolios.

Syllabus: [Models of Fixed Income Securities and Interest Rate Options:] Interest rates, LIBOR, zero rate, forward rates, yield curve, duration, convexity; forwards and futures on currencies; immunization; interest rate swaps; boot-strapping the yield curve; currency swaps; interest rate derivatives: bond options, caps and floors, caplets and swaptions; Blackâ€™s models.

[Credit Derivatives:] Credit default swaps; hedge-based pricing. Collateralised debt obligations. Credit spreads and implied default probabilities. Bond based pricing of credit derivatives. Spread curves.

[Time Series models of equity returns and volatility:] Analysis of return series; tests for skewness and excess kurtosis; stationarity, ACF and PACF; brief survey of AR and MA models; models of volatility: ARCH and GARCH: kurtosis, forecasting; brief survey of variations on GARCH such as I-GARCH, M-GARCH; leverage effect and EGARCH.

[Portfolio selection models:] diversification; minimum variance and the Markowitz problem (vector treatment of n-asset problem); market portfolio; CAPM; systematic risk; CAPM as a pricing model; weaknesses of CAPM.

MT4002 - MATERIALS 1  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: This is a course in Engineering Materials for students with no previous background in the subject. It is designed to meet the needs of engineering, science and design students for a first materials course, emphasizing design applications.

Syllabus: Introduction to engineering materials and their properties.

Price and availability of materials
The Elastic moduli (bonding between atoms, packing of atoms in solids, physical basis of Young's modulus
Yield strength, tensile strength and ductility (dislocations and yielding in crystals, strengthening methods and plasticity of polycrystals)
Fast fracture and toughness (micromechanisms of fast fracture)
Fatigue failure (fatigue of cracked and uncracked components, mechanisms, design against fatigue)
Creep and creep fracture (kinetic theory of diffusion, mechanisms of creep and creep-resistant materials)
Design with materials
Case Studies and laboratory experiments incorporating examples of mechanical testing, failure analysis, design and materials selection.

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MT4208 - MATERIALS SELECTION AND DESIGN  
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The student should be able to assess engineering components with regard to the design function.
The student should be able to determine and use quantitative and qualitative materials selection criteria.


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MT4943 - MATERIALS PROCESSING  
ECTS Credits: 6

School of Engineering

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.

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MU4136 - IRISH TRADITIONAL MUSIC 2  
ECTS Credits: 6

Humanities

Rationale and Purpose of the Module: To introduce the students to the history and structures (musical and in a wider cultural sense) of traditional Irish music and dance.

Syllabus: Issues addressed in this module will be instrumental and dance style, Irish language song tradition, nineteenth-century collections, contemporary issues, sean-nós and set dancing.
**NS4002 - SCIENCE FOUNDATION 2 : GENETICS**
ECTS Credits: 3

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The aim of this module is to enhance the student's knowledge and understanding of the causes of hereditary linked disorders

**Syllabus:** Cell biology Prokaryote and eukaryote cells
- Cell divisions; Biological basis of heredity; The clinical significance of Mendelian inheritance in humans. The nature of DNA genes; Genes; Alleles; Chromosomes; Autosomes and sex chromosomes; How genes function, autosomal dominant; Predictions of genetic outcomes; Autosomal recessive inheritance, Autosomal dominant inheritance, X linked recessive inheritance including common disorders, X linked dominant for each; Mitochondrial inheritance including common disorders, Multifactorial inheritance including disorders;
- Comparative analysis of single gene conditions;
- Chromosomal disorders - autosomal abnormalities, sex chromosomal abnormalities, changes in chromosome structure, changes in chromosome number; karyotyping; Genetics of common mental and disorders; Genetics of common physical disorders, polygenic inheritance; Some basic concepts in population genetics.; Genetic screening; New born screening for genetically inherited conditions including phenylketonuria, maple syrup urine disease, homocystinuria, galactosaemia, cystic fibrosis; Factors influencing teratogenesis; Genes and cancer; Genetic counselling.

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**NS4022 - PHARMACOLOGY FOR NURSES AND MIDWIVES**
ECTS Credits: 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of this module is to provide the student with a knowledge and understanding of the principles of pharmacology with application to the role of the nurse and midwife in safe and effective medication process.

**Syllabus:** Pharmacology: Definitions; drugs, pharmacology, drugs, pharmacodynamics, pharmacokinetics, therapeutics, pharmacodynamics.
- Drug dosage forms and routes of administration. Sources of drugs; Classifications and pharmacological effects (including adverse reactions) of commonly prescribed drugs, psychopharmacology. Sources of drug information. Regulation of drugs. Factors modifying drug response. (including drug interactions). Bioavailability, disposition, antimicrobial susceptibility,. Therapeutic index and dosage of antimicrobial drugs.potential for drug toxicity. Concept of bioequivalence. Controlled - release dosage forms. Therapeutic drug monitoring.
- Clinical Skills;
  - Policy Guidelines and guidelines, (ABA and local) and: Bord Altranais agus Cnáimhseachais na hÉireann and local guidelines and their application to practice
  - Medication safety procedures
  - Drug calculations
  - Administration routes and techniques
  - Preparation and care of the patient/client service user receiving intravenous therapy
  - Care and management of women with epidural/spinal anaesthesia
  - Blood and blood products
  - Blood transfusion
  - Introduction to venepuncture

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**NS4072 - MIDWIFERY PRACTICE AND NORMAL BIRTH**
ECTS Credits: 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The module will give students the knowledge and skills to assess, plan and implement midwifery care for women and their families experiencing normal childbirth.

**Syllabus:** Birthing Environment; Assess, plan and implement midwifery care for women and their families experiencing normal childbirth throughout the intranatal and postnatal period; Physiology and care of women in the 1st, second stage, third stage of labour, care of the pelvic floor in childbirth; The physiology of pain; The role of pain in normal birth; Non-pharmacological methods of pain relief; Principles of drug administration for pain relief in labour including inhalation and epidural analgesia. Physiology and care in the puerperium. Bereavement and loss in childbirth. Communicating and recording clinical practice.

**Clinical skills:**
- Recognition of the onset of normal spontaneous labour
- Assessment and care of a woman on admission and throughout labour
- Vaginal examination
- Introduction to K2 Medical Systems Fetal Monitoring Training System
- Demonstrates positions for labour and birth
- Principles of elimination management; micturition and catheterisation
- Demonstrates the normal mechanism of labour
- Assisting a woman giving birth
- Maintaining a safe environment for normal birth
- Management of the third stage of labour
- Examination of the placenta and membranes
- Assessment and care of a woman and her baby in the postnatal period
- Documentation to include partograph

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**NS4074 - SEXUAL AND REPRODUCTIVE HEALTH IN MIDWIFERY**
ECTS Credits: 6

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module will enable the student to promote gynaecological and reproductive health and well-being and provide care for women with related gynaecological and reproductive problems.

**Syllabus:** Gynaecological health and well being wellbeing and care for women with related problems, to include endometriosis, poly cystic ovarian syndrome, cervical cancer screening, breast awareness, gynaecological cancers. Topics addressed will include fertility/, infertility and its impact on women's well-being, pre-conception care, sexuality and childbearing, sexual and reproductive health needs of diverse groups eg teenagers, travellers,. Cultural issues which impact impacting on sexuality, fertility and childbearing e.g. female genital mutilation. Health promotion strategies appropriate within maternal health, use of complementary therapies in childbirth, reproduction and childbearing. The role of the midwife in family planning and contraception,. Impact of substance abuse on childbirth, sexually transmitted infections, consequences of childbearing childbearing including morbidity and mortality, pregnancy and . Perinatal mental health, domestic violence/abuse. Applied pharmacology.
NS4084 - CARE OF THE AT RISK AND ILL NEONATE
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: This module will enhance the students role and responsibilities in relation to the care of the at risk and ill neonate.

Syllabus: Systematic care for the at risk and ill neonate e.g. management of cardiovascular and respiratory disorders, neonatal jaundice, metabolic transient disorders, endocrine disorders and congenital anomalies, infections in the neonate, trauma in the neonate.; complications arising with low birth weight, preterm and post term infant; breastfeeding management under difficult circumstances, midwives role within the multidisciplinary team; neonatal resuscitation and rapid midwifery intervention; perinatal and infant morbidity and mortality; adoption and fostering; child protection issues; support in the context of bereavement and loss

CLINICAL SKILLS:
Assessment and management of the at risk and ill neonate Nutritional support for the at risk and ill neonate (feeding practices oral, nasogastric)
Care of baby in an incubator and under phototherapy Administration of medication to the neonate

NS4204 - RESEARCH FOR NURSES AND MIDWIVES
ECTS Credits: 3

Nursing & Midwifery
Rationale and Purpose of the Module: The module aims to develop knowledge, attitudes and skills to critically review research literature, and understand the contribution of research to nursing and midwifery practice is promoted

Syllabus: Ways of knowing in Nursing, Midwifery and health care practice. Accessing sources of knowledge: searching, reading, critiquing literature. Philosophical and theoretical underpinning of research: philosophy and research paradigms, Ethical issue. the research process: developing a research concept, statement, design. Introduction to methodology: qualitative, quantitative, action research. Data collection and analysis, writing up research

NS4212 - COMMUNICATIONS AND THERAPEUTIC RELATIONSHIPS
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: The module will introduce the skills and knowledge necessary for the development of effective communication in nursing and midwifery practice. The module will facilitate the development of students' communication and interpersonal skills so as to enhance professional and therapeutic relationships with patients, clients, women, service users and their families, members of the public, colleagues and other members of the health care team.


Clinical Skills
Communication skills: self-awareness, verbal, non-verbal; listening, explaining, questioning, assertiveness, interviewing skills, recording clinical practice
Development of therapeutic relationships: therapeutic use of self
Group communication and group dynamics
Communication with persons with a disability/impairment
Communication: breaking bad news, conflict situations, admission, assessment and documentation

NS4214 - ENDOCRINE AND REPRODUCTIVE NURSING
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: This module will address the nursin care and management of individuals' endocrine and reproductive disorders and the provision of appropriate nursing care for individuals with such condition(s) in the acute and community setting

Syllabus: Integrate professional values and nursing roles through nursing assessment and management of endocrine disorders: e.g. diabetes, thyrotoxicosis and hypothyroidism. Nursing assessment and management of reproductive disorders: e.g. benign/malignant breast disorders, dysfunctional uterine bleeding, cervical carcinoma; menopause, sexual health problems: e.g. infertility, endometriosis, and sexually transmitted infections within primary, secondary and tertiary healthcare settings. Nurse's role and responsibilities in the investigative and diagnostic procedures within the healthcare team. Applied pharmacology.Clinical Skills

Clinical Skills
Insulin administration, techniques
Women's health - breast awareness, cervical screening
Men's health - testicular examination

NS4222 - RESPIRATORY AND CIRCULATORY NURSING
ECTS Credits: 6

Nursing & Midwifery
Rationale and Purpose of the Module: The module will introduce the skills and knowledge necessary for the development of effective communication in respiratory and circulatory care. The module will facilitate the development of students' communication and interpersonal skills so as to enhance professional and therapeutic relationships with patients, clients, women, service users and their families, members of the public, colleagues and other members of the health care team.

Rationale and Purpose of the Module: This module will address the nursing care and management of individuals with respiratory, circulatory, blood and lymph disorders. The nurse's role in the supportive-educative process will be explored in respect of acute or progressive respiratory and circulatory disorders. The aim of this module is to facilitate students understanding of respiratory, circulatory, blood and lymph disorders so that they may provide appropriate nursing of an individual with such condition(s).

Syllabus: Nursing care and management of individuals with respiratory disorders e.g. infection, chronic obstructive pulmonary disorders, asthma, carcinoma, airway obstruction. Nursing care and management of a patient with a tracheotomy/tracheostomy. Nursing care and management of individuals with cardiovascular disorders e.g. hypertension, myocardial infarction, congestive cardiac failure, shock. Nursing care and management of a patient receiving a blood transfusion. Disorders of blood and lymph: anaemia, leukaemia. Nurses role in the collaborative process of care with individuals and the family/carer. Related pharmacology. Nurses role and responsibilities in investigative, diagnostic procedures.

Clinical Skills Syllabus: Oxygen therapy Suctioning techniques Nebulisers/inhalers Peak flow Active and passive limb exercises. Tracheostomy management: dressings, removal, cuff inflation/deflation Emergency. Intra pleural drainage: underwater seal drain, Postural drainage Intravenous infusions Introduction to blood transfusion

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NS4224 - NEUROLOGICAL, SENSORY AND MUSCULAR-SKELETAL NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to facilitate students' understanding of neurological, sensory and musculo-skeletal disorders and to provide appropriate nursing care to an individual with such condition(s) across all healthcare settings.

Syllabus: Neurological disorders: e.g. head injuries, increased intracranial pressure, cerebral vascular accident, epilepsy, meningitis, multiple sclerosis, Alzheimer's and Parkinson's disease; nursing care and management. Nursing care and management of individuals with auditory and visual disorders: Musculo-skeletal disorders: e.g. osteoporosis, fractures, amputation, spinal injuries; arthritis, nursing care and management. Nurses role and responsibilities in investigative and diagnostic procedures. Applied pharmacology. Fracture management and care e.g. cast care, traction, external skeletal fixation, limb elevation Positioning and mobilising after orthopaedic surgery Eye care Ear care Stroke positioning Glasgow coma scale and other neurological assessments Assisting patients with mobility

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NS4322 - NURSING THE CHILD WITH INTELLECTUAL DISABILITY
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The module aims to introduce students to the nature and manifestations of conditions associated with intellectual disability. A person centred approach which places children and their families at the centre of care is espoused at all times

Syllabus: Peri and post natal development; screening tests at birth and premature reflexes. Intellectual disabilities: incidence, causation, manifestations nursing care and management of a child presenting with an intellectual disability e.g. Down syndrome, cerebral palsy, autism, genetic conditions, hydrocephalus. Complex and continuing health care needs e.g. epilepsy, contractures and restriction in movement. Communication and language needs of the child. Play and music as a developmental process and therapeutic activity. The function and role of movement and physical fitness in the acquisition of social skill and self-help development. Education and integration into mainstream facilities. Concept of child protection; recognition and consequence of child abuse, procedures and guidelines for reporting abuse. Applied pharmacology

Clinical Skills Syllabus: Assisting babies/children at mealtimes and bathing

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NS4324 - NURSING THE INDIVIDUAL WITH MULTIPLE NEEDS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The aim of this module is to introduce the student to the care and management of persons with an intellectual disability with associated physical and sensory impairment.


Clinical Skills Syllabus: Breast awareness Testicular examination Cervical screening Monitoring of blood glucose and administration of insulin Wound management and associated dressing techniques

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NS4422 - MOOD AND EMOTIONAL DISORDERS AND MENTAL HEALTH NURSING
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to introduce the student to common anxiety and mood related disorders and the consequent impact of these disorders on individuals' biopsychosocial well-being and functioning. The role of the nurse in delivering evidenced based interventions that facilitate recovery of persons experiencing mood and anxiety related disorders. across primary, secondary and tertiary health care settings will be discussed.

Use and care of nebulisers, peak flow measurement, inhalers/chambers, oxygen therapy, and suctioning technique

Principles in performing active and passive limb exercises

Assess levels of consciousness

Basic instrumental/music skills

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Clinical Skills: Communication and therapeutic relationship skill development to work with persons with mood and emotional disorders
Interview and assessment skills
Care plan documentation
Skills in Cognitive Behavioural Interventions for anxiety and mood disorders e.g. anxiety management techniques, relaxation training, activity scheduling. Peri-operative care in relation to ECT. Suctioning technique positioning of service user

NS4424 - NURSING THE OLDER PERSON WITH INTELLECTUAL DISABIL
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: To develop students knowledge regarding the ageing process and the specific needs of older persons with an intellectual disability.

Syllabus: Ageism, concepts and theories of ageing, physiological social and psychological changes associated with generic ageing and the older person with an intellectual disability. Nursing care and management of support for the older person with an intellectual disability. Person centred planning and the concept of choice and quality of life in older adulthood. Nursing process applied to the older person with an intellectual disability associated with age related illness. Living arrangements and service provision for the older person with an intellectual disability. The following concepts related to the older person with an intellectual disability; retirement, recreational and leisure pursuits, spiritual care, pastoral care and palliative care. Applied pharmacology.

Clinical Skills Syllabus:
Central Nervous System (CNS) examination
Facilitative communication skills: reality orientation, reminiscence and art therapy
Assisting an older person with mobility and engagement in activities of living
Environmental comfort and last offices

NS4434 - PSYCHOTIC AND PERSONALITY DISORDERS AND MENTAL HLTH
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: The purpose of this module is to develop the students’ knowledge and understanding of the role of the nurse in the care and management of an individual experiencing personality or psychotic disorders.

Syllabus: Disorders of thought and perception; e.g. schizophrenia, presentation, aetiology, types, classifications, epidemiology, and socio-cultural aspects. Personality disorders; theories, classifications, characteristics. Nursing assessment and management of persons with a schizophrenia and personality disorder. The role of the nurse in providing effective therapeutic interventions which facilitate recovery and well-being in persons with schizophrenia or personality disorders and their families/carers. Related pharmacology. Contemporary research findings and relevant health policy.

Clinical Skills Syllabus:
Facilitation of group therapy
Counselling skills and processes
Crisis intervention strategies
Central Nervous System (CNS) examination
Active and passive limb exercises
Assisting with mobility

NS6038 - PROMOTING QUALITY AND SAFETY IN HEALTHCARE
ECTS Credits: 12

Nursing & Midwifery

Rationale and Purpose of the Module: Nurses are increasingly being recognised as key stakeholders within health service organisations. At specialist and advanced practice levels, nurses are expected to contribute to safe and effective healthcare provision and promote quality care. This module explores the concept of quality and safety in healthcare in promoting quality patient outcomes.

Syllabus: Principles of promoting quality, safety and clinical governance in shaping global healthcare practice; safety culture; quality systems and regulations; patient focus within healthcare; sources and levels of evidence
underpinning practice; current national and international projects in evidence based practice; critical thinking; factors influencing clinical decision-making; hierarchies of evidence; strategies to promote quality and safety in promoting quality patient outcomes.

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**NS6040 - INTERCULTURAL CARE**
ECTS Credits: 9

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The purpose of this module is to examine the knowledge, skills and attitudes required by health care professionals to care for individuals from diverse cultural, ethnic and linguistic backgrounds.

**Syllabus:** Globalisation and the changing demographic profile within healthcare; opportunities and challenges of living and working in culturally diverse societies globally, concepts of culture, race and ethnicity; theories and Models promoting transcultural health and cultural competence; cultural identity and self-awareness, ethnocentrism and stereotyping, National and international legislation and influences related to immigration, human rights, discrimination and healthcare/service provision, policy developments that promote cultural sensitivity at an individual, organisational and society level, cultural generic and cultural specific knowledge, intercultural communication, challenging racism, discrimination and inequalities.

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**NS6042 - THERAPEUTIC ENGAGEMENT**
ECTS Credits: 9

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module will build on previous knowledge/skills to facilitate practitioners to use therapeutic engagement at specialist/advanced levels in nursing/midwifery practice. Therapeutic engagement is an essential means through which healing and personal growth and development are achieved within nursing and midwifery practice.

**Syllabus:** Theoretical foundations of therapeutic engagement and counselling. Person centred/humanistic; cognitive and behavioural; and psychodynamic approaches to the therapeutic process and counselling. Therapist qualities and needs. Therapeutic use of self.

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**NS6112 - INTERPROFESSIONAL WORKING IN ACUTE AND EMERGENCY CARE PRACTICE**
ECTS Credits: 9

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** This module builds on Principles of Interprofessional Working module in Semester 1 in which the principles identified are further operationalised into acute and emergency care nursing and pre-hospital practice. The students will explore and actively demonstrate through participating in clinical simulation scenarios the assessment, management and co-ordination regimes of the person requiring acute and emergency care from an interprofessional perspective as well as nursing and pre-hospital care perspectives. Interprofessional working is the cornerstone of the module and will be used to facilitate students to view the patient journey from point of initial contact, through emergency stabilisation and onward to rehabilitative care and discharge.

**Syllabus:** Assessment, management, co-ordination of the acutely ill patient; medical, surgical, trauma, paediatric emergencies; the older person requiring acute and emergency care and those with minor injuries. Primary and secondary surveys; nursing and pre-hospital care assessments. Team and 'pitch' management strategies; multi-disciplinary transitional, patient care pathways. Pharmacological and clinical skills interventions. Specific nursing and pre-hospital roles in the management of the acutely ill and emergency patient. Interprofessional approaches to care; communicating with and between other professions, appropriate handovers; interdepartmental messaging. Professional regulation and accountability in the acute and emergency context.

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**NS6302 - INFECTION PREVENTION AND CONTROL IN HEALTHCARE**
ECTS Credits: 9

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** Infection prevention and control is a critical concern for patients, clients, health care employees, health care administrators and government agencies. This module explores infection control measures necessary to prevent and manage the spread of illnesses and identify appropriate infection control measures. The clinical and financial consequences of healthcare associated infections are increasingly recognised. The Health Service Executive (HSE) is committed to a National Infection Control Action Plan which includes a 20% reduction in health care associated infections, a 30% reduction in MRSA infections and a 20% reduction in antibiotic consumption. In order to deliver on the vision of improved Infection prevention and control outcomes the focus is on the development of a culture of quality care, process and outcome measurement, education and high quality research. All healthcare employees are required to have an in-depth knowledge of the infection prevention and control processes involved in caring for patients. There is evidence that there is a significant shift in health care workers compliance with infection prevention and control practices and guidelines, following educational programmes. An education module for healthcare professionals on infection prevention and control will contribute to the achievement of identified targets in the reduction of healthcare associated infections and excellence in patient care in Primary, Acute, Community and Continuing Care settings.

**Syllabus:** Microbiology: Chain of infection, infection prevention and control standards and guidelines, modes and mechanisms of transmission of pathogenic organisms in the health care setting. Communicable diseases and multi resistant organisms. Antibiotic use and resistance. Strategies for prevention and control of infection. Invasive medical devices and care bundles. Creation and maintenance of a safe environment for patient care in all health care settings through application of infection control principles and practices for cleaning, disinfection and sterilisation. Audit, surveillance and research. Includes sourcing up to date information, surveillance of health care associated infection and how surveillance is used to improve patient care.
PA4011 - THE CIVIL AND PUBLIC SERVICE
ECTS Credits: 6
Politics and Public Admin
Rationale and Purpose of the Module: To identify, analyse and explore the role and functions of the civil service within the context of the overall politico-administrative system in Ireland.
Syllabus: Key features of the modern democratic state; the Irish state at independence; growth of the public sector; the constitutional and legal position of the public service; the structure of the public service; the civil service; government departments; ministerial responsibility and ministerial resources; the higher civil service and the policy process; coordination and control of the policy process; civil service reform and modernisation.

PA4018 - THE PUBLIC POLICY PROCESS
ECTS Credits: 6
Politics and Public Admin
Rationale and Purpose of the Module: Aims: This course aims to provide students with an overview of the theory and practice of policy analysis. The process of public policy making in the modern democratic state will be explored with particular reference to the socio-political environment of policy making and organisationally based decision processes within public administration.
Objectives: - To build an understanding of what policy is, nature of policy problems and the role of problem definition in structuring policy - To focus on theories of the public policy process and explore the variety and complexity of decision making processes - To identify a classification of approaches to the analysis of public policy - To investigate and understand how information about public policies is made available and is accountability for outcomes clear - To evaluate the policy process in government and public bureaucracies through the analysis of case study material - To promote career development skills
Syllabus: What is public policy?; stages approach to the policy process; power approaches - elitism, pluralism, corporatism; agenda setting; models of decision making - Simon, Lindblom, Allison, Etzioni, Dror; institutional approaches; rational choice theory; policy networks; policy transfer; policy implementation; evaluation; accountability; Europeanisation
Prerequisites: PA4021

PA4038 - PUBLIC ADMINISTRATION IN DEMOCRATIC STATES
ECTS Credits: 6
Politics and Public Admin
Rationale and Purpose of the Module: All states distinguish between those activities that are best carried out on behalf of the people by the state, those that are best left to markets, and those that are most appropriately the responsibility of individuals, families and other civic organisations. In this module we examine the alternative views about where best to draw these lines, with a view to more fully comprehending the choices that face all governments and citizens.
Syllabus: The exposition is largely chronological. We begin with an introduction to the precepts of classical political economy, the challenges presented to these views by the development and growth of social democracy, and alternative explanations for the relationship between markets and welfare. We proceed by examining the historical development of welfare states in Europe, their growth and contraction and associated political movements and look at the impact of these on state administration. Towards the end of the module, we will attempt to apply the ideas and concepts that we have explored at a more general and European level specifically to the Irish case. We end with a series of contemporary Irish case studies which critically examine the most recent (alleged) transformation of the Irish state.
Prerequisites: ID4811, ID4812

PD4044 - DESIGN VISUALISATION
ECTS Credits: 6
School of Design
Rationale and Purpose of the Module: The aim of this module is to build upon the learning outcomes from ID4811/2 in first year where students learn to represent their design ideas graphically through the traditional media of pens, pencils markers etc. This module will develop skills of product representation using design CAD software (Adobe Creative Suite). The students will be able to: Understand the needs and practices of presentation in design Project the meanings behind the concepts through visual methods Graphically represent concepts using the Adobe Illustrator as a drafting tool Undertake visualisations of products that are photo-realistic representations in 2D using Adobe Photoshop graphic software tool Undertake Product/systems presentations using Adobe InDesign graphic design tool. Photography and digital editing. Contextualisation of products (graphically place in-situ).
Syllabus: Interpretation of 3D forms and detail design in 2D rendering. Develop a visualisation skill-set in computer-based visualisation. CAD used as a tool in the processes of design visualisation (product renderings) and representation to convey product form, finish, texture and meaning. Contextualisation of products in environments of use. Communication of design concepts. CAD used as a design tool in graphic design and presentation. Project-based-learning in Design visualisation underpins the Studio learning method.
Prerequisites: ID4811, ID4812

PD4102 - DESIGN STUDIO 2
ECTS Credits: 6
School of Design
Rationale and Purpose of the Module: To develop the basic skills in and cognitive processes of product design and to continue to build from PD4101 to lay the foundations for the 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
Design Methods:
To develop an approach to design - Working to a brief - following a design process - Working to a time schedule - Stimulating the imagination through design projects - an introduction to conceptual 2D and 3D design skills - basic problem solving- basic creative thinking techniques - an introduction to the relationship between design and manufacture - An introduction to user research and user understanding and simple ergonomics - The development of high fidelity prototyping and sketch-model making skills - The development of the manual and cognitive skills of idea development and communication

Design Techniques:
The development of drawing, illustration and rendering skills - perspective, form building and orthographic technical drawing - the practical development of the manual and mental skills of idea development and communication - Both formal and informal techniques - Emphasis on fluidity and speed - The of 2D and 3D shape and form understanding through the use of tone and colour using rendering media including felt-tipped pens, pencils, pastels, gouache and markers - fundamentals of professional presentation techniques and graphic layout.

Design History:
An overview of industrial design in the context of social and economic conditions (from the Industrial Revolution to Contemporary Design). Discussion of the evolution of design styles and practices and how design style and economic conditions (from the Industrial Revolution to Contemporary Design).

PD4124 - CONTEMPORARY DESIGN CULTURE
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: To allow students to place their design practice in an international, cultural and historical context, to introduce contemporary trends, concepts and philosophies, to allow students to develop an appreciation for design and professional practice


PD4104 - DESIGN STUDIO 4
ECTS Credits: 6

School of Design

Rationale and Purpose of the Module: To effectively experiment, analyse, innovate and plan a design project from inception to completion. Understand and develop design ideation. Implement a variety of design tools and methodologies. Engage in multidisciplinary teams. Collaborate with industry partners. Improve teamwork skills. Improve primary design research skills.

Syllabus: The following is an outline of topics covered in project based studio classes:
- Evaluation and filtering methods for concept selection.
- Idea generation techniques.
- Implementation of entire design process from research to design detailing.
- Design ideation.
- Engagement with industry partners through sponsored design projects.
- Visual communication tools.
- Advanced design skills development.
- Usability principles - testing and analysis.
- Graphical user interface interaction.
- Product design focused manufacturing techniques and materials.

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PE4112 - PRODUCTION TECHNOLOGY 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To provide the student with a basic knowledge and experience of the methods employed in the processing and fabrication of common engineering materials. To develop the students' communication, visualisation and draughting capabilities. To emphasise the importance of safety in the engineering environment.


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PH4008 - HYDROCARBON FUELS
ECTS Credits: 6

Physics

Fundamentals of coal, oil and natural gas and their conversion to useful energy products. Hydrocarbon resource terminology - proven reserves, indicated reserves inferred reserves. Coal formation, reserves. Coal extraction and production. Use of coal, combustion, gasification and use in blast furnaces, coke formation. Coal composition, properties, analysis and classification - ranking of coal from sub-bituminous to anthracite. Coal combustion, liquefaction and gasification. Electricity production from coal combustion. Clean coal
technology - gasification with combined cycle. Origins and geology of oil and gas. Oil and gas reserves. Non conventional sources of petroleum - oil shale, tar sands and heavy oil deposits. Liquid petroleum fuel and its classification, distillate, non distillate fuels etc. Oil refining and products. Petroleum hydrocarbon structures, the refining process - distillation (fractionation), reforming, alkylation, polymerisation, hydrotreating and sulphur plants. Oil from coal and gas. Oil and gas engines, spark ignition engine, compression ignition engine and sterling engine.

**PH4012 - PHYSICS FOR ENGINEERS 2**
ECTS Credits: 6

**Physics**

**Rationale and Purpose of the Module:** Continuation of an introductory course in physics (PH4011) for engineering students.


**Prerequisites:** PH4011

**PH4018 - MEDICAL INSTRUMENTATION**
ECTS Credits: 6

**Physics**

**Rationale and Purpose of the Module:** To provide an understanding of the basic principles of mechanics, heat, fluids, waves, optics, sound, the atom and nucleus, and how these are relevant to our daily life.

**Syllabus:** Measurement and units: The SI system, basic and derived. Mechanics: Displacement, velocity, acceleration, Newton/E's laws of motion, force, mass momentum, work, energy, power. Heat: Temperature, calorimetry, specific heat capacity, latent heat, heat transfer, thermal conductivity, u-value. Properties of Fluids: density, pressure due to a liquid and gas, Boyle's law, Charles Law, fluid flow and viscosity, Pascal's principal, liquid flow in pipes. Optics: Geometrical optics, properties of optics, reflection, laws of reflection, refraction, laws of refraction, mirrors, lenses, total internal reflection, critical angle, optical instruments. Waves: Properties of waves, wave nature of light, Huygen's principle, double-slit experiment, diffraction, interference, diffraction gratings, Young's polarization of light, the electromagnetic spectrum, ultraviolet, visible light, X-rays, infrared radiation. Sound: Nature of sound. The speed sound, speed of sound in different media, the temperature dependence of the speed sound in air frequency spectrum, audible region, ultrasonic region, infrasonic region, sound intensity level, the decibel scale, sound phenomena. The atoms and Nucleus: Sub-atomic particles, nuclear radiation, radioactivity measurement of radiation, radiation and health.

**PH4032 - PHYSICS FOR GENERAL SCIENCE 2**
ECTS Credits: 6

**Physics**

**Rationale and Purpose of the Module:** To introduce the student to general wave motion, optics and acoustics. To introduce the student to the mechanical and thermal properties of matter.

**Syllabus:** Review of the basic concepts of force and energy. Oscillations and simple harmonic motion: transverse and longitudinal waves, superposition, speed,

PH4038 - ENERGY STORAGE
ECTS Credits: 6

Physics
Fundamentals of advanced energy conversion and storage.


ECTS Credits: 6

Physics
Rationale and Purpose of the Module: The purpose of this module is to enhance students understanding of key concepts and models associated with thermal physics. The objectives are to first present a general thermodynamics framework, then to introduce statistical concepts followed by analysis of specific physical models.

Syllabus: Temperature: thermal equilibrium; the zeroth law; equations of state; temperature scales. [First law of thermodynamics]: internal energy; heat and heat capacity; reversible processes and work; free expansion and Joules law. [Second law of thermodynamics]: Carnot cycles, efficiency; thermodynamic temperature scale. [Entropy]: Clausius inequality and entropy; principle of increasing entropy; central equation of thermodynamics; entropy of an ideal gas. [Thermodynamic potentials and Maxwell relations]: internal energy U; enthalpy H; Helmholtz free energy F; Gibbs free energy G; energy equations; availability A and useful work; mechanical, magnetic & electrolytic systems. [Change of phase]: chemical potential; Clausius-Clapeyron equation; nucleation; Gibbs phase rule. [Microstates and macrostates]: statistical weight of a macrostate; Boltzmann definition of entropy; entropy and disorder. [Equilibrium of an isolated system]: magnetic dipole lattice; Schottky defects. [Equilibrium of a system in a heat bath]: the partition function and the Boltzmann distribution; equivalence of thermodynamic and statistical quantities; the classical gas; heat capacities of solids; perfect quantal gas; Planck's law; thermodynamics of black body radiation. [Equilibrium of a system with variable particle number]: Gibbs distribution; Fermi-Dirac and Bose-Einstein distributions; Bose-Einstein condensation; Fermi energy; density of states; electrons in metals.

Prerequisites: PH131

PH4048 - FIRST / SECOND GENERATION BIOFUELS
ECTS Credits: 6

Physics
1st generation biofuels technologies (Bio-ethanol production, including substrate preparation, microbial conversion and separations, thermo-chemical conversions, including combustion, gasification and pyrolysis and the use of these for green electricity production; biogas production, both from landfill sites, animal dung and waste water treatment, biodiesel production including process basics, product purification and waste treatment). Pure Plant Oil (PPO) pure vegetable oil cold pressing, extraction, refining, biodiesel transesterification to methylether, ethanol from sugar crops, fermentation, distillation; ethanol from starch crops hydroylsis, SNG from biogas; biogas digestion, CO2H2O-removal; hydrogen from biogas, biohydrogen digestion, steam reforming/wgs CO2-removal. Carbohydrate Chemistry. 2nd generation biorefining, ethanol from sugars, batch and continuous processes, ethanol from starch, ethanol from lignocellulosic biomass (pre-treatment either physical or chemical, detoxification, hydrolysis of cellulose, fermentation of biomass hydrolysates. Chemical hydrolysis, pre-treatment (acid/alkaline release, ionic liquids). Hydrolysis processes, platform chemical, potential fuels and fuel additives MTHF, fuel esters. Thermochemical processes; pyrolysis, gasification, upgrading of pyrolysis oil. Biosyngas upgrading Fischer-Tropsch (FT) diesel, water gas shift gs, synthesis, hydrocracking, Methanol Biomethanol from gasification. MTBE Bio-MTBE synthesis methanol and isobutylene; DME biodimethylether, alcohols from syngas; hydrogen from syngas biohydrogen gasification, wgs, CO2-removal, HTU diesel synthetic biofuel HTU, HDO, refining pyrolysis-diesel synthetic biofuel pyrolysis, HDO, refining SNG from wet materials, biogas, synth. biofuel. Super/subcritical gasification.

ECTS Credits: 6

Physics
The history of transportation, transportation modes, the need for transport in Ireland. Strategies to avoid transport (broadband, video conferencing). The use of Irelands large wind power capacity to innovate and develop new type of electric based vehicles (Hybrid, Hydrogen, Ultra Battery, Super Capacitor...), Storage technology for vehicles (NiMh, Li-ion, Sodium-Sulfure...), application of second generation biofuel to long haul flights and aviation in general, possible development of Ocean Thermal Energy Conversion to power ferries and ships, sustainable transportation networks, system-optimisation versus user-optimisation, the classic urban transportation problem, congestion, infrastructure demand, modelling and use of data to predict transportation problems, engine technology (diesel,
common rail, petrol, electric, hybrid...), green house effect, carbon emission, trend of buying oversized vehical, American versus European trend.

PH4062 - NANOTECHNOLOGY 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: The purpose of this module is to enhance the students' understanding of key concepts of mechanics, optical and electronic transport properties of nanostructured materials and to develop an understanding of the importance of mechanical and electro-optical properties in applications of nanostructured materials.


Prerequisites: PH4081

PH4072 - ELECTROMAGNETISM
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: To introduce the student to the physics of semiconductor devices and to their application

Syllabus: Conduction in solids: elementary band theory of conductors, semiconductors and insulators, doping; donor and acceptor impurities, intrinsic and extrinsic conduction, majority and minority charge carriers. The PN junction: junction diode and applications, Zener diode, the bipolar transistor; transistor action, applications the emitter amplifier, early effect; the field effect transistor, JFET, MOSFET, characteristics and application in simple circuits. Combinational Logic: Binary Logic, Logic functions; AND, OR, NOT; Truth table; Boolean Algebra; Boole Boolean postulates and theorems, De Morgan; Logic gates - complete set; NAND and NOR implementations of logic functions; Multiple-input gates. Sequential Logic: Memory, feedback, synchronous/asynchronous, Flip-flops, Latches; basic SR latch, gated SR Latch, D-type, Master-slave latch, JK Latch; Shift Registers, Counters, UART (block diagram). Operational and Instrumentation amplifiers: desirable characteristics, comparators, voltage reference, virtual earth, voltage follower, Nyquist/Shannon sampling theorem.

Prerequisites: PH4131

PH4102 - WAVES/LIGHT/MODERN PHYSICS
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: To introduce the student to general wave motion, optics and acoustics and to provide the student with a general introduction to special relativity and to atomic and nuclear physics.

Syllabus: Oscillations and simple harmonic motion: transverse and longitudinal waves, superposition, speed, reflection, harmonic waves. Sound: sound waves, sound intensity, Doppler effect. Light: EM Spectrum, Sources of light, Geometrical optics; reflection, refraction, dispersion, achromatic optics; Physical optics; interference, diffraction, diffraction gratings, polarisation; Optical systems; the microscope, the telescope, the eye. Special Relativity: Einstein’s Postulates, time dilation, length contraction, the Lorentz Transformation; relativistic momentum and energy conservation. Atom: Classical models, Planck’s quantum hypothesis, the Bohr atom, The photoelectric effect; quantized energy; the de Broglie wavelength. The nucleus: nucleons; isotopes; nuclear structure; binding energy. Radiation: X rays, alpa, beta and gamma radiation, the law of radioactive decay. fission and fusion; nuclear reactors. Detection, dosage.
PH4111 - SEMICONDUCTORS 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: The purpose of the module is to introduce advanced CMOS process technology and the problems associated with device fabrication as the technology moves towards 30 nm features and below.


Prerequisites: PH4071, PH4805

PH4608 - SOLID STATE PHYSICS 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: The purpose of this module is to enhance the student's understanding of key concepts in solid state physics, magnetism, superconductivity and low dimensional systems.


Prerequisites: PH4607

PH5092 - SEMICONDUCTOR PROCESSES 2
ECTS Credits: 6

Physics

Rationale and Purpose of the Module: The purpose of the module is to introduce advanced CMOS process technology and the problems associated with the device fabrication as the technology moves towards 30 nm features and below.


Prerequisites: PH4071, PH4805
Physics

**Rationale and Purpose of the Module:** The purpose of this module is to enhance the students' understanding of key concepts of mechanics, optical and electronic transport properties of nanostructured materials and to develop an understanding of the importance of mechanical and electro-optical properties in applications of nanostructured materials.


**PH6031 - PHYSICS OF MEDICAL INSTRUMENTATION**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** To introduce the special considerations for electric/electronic instruments attached to patients for the purposes of diagnosis or therapy.

* To introduce the medical device directive and the regulatory environment.
* To introduce the student to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes.
* To provide a working knowledge of the operation of this equipment.

**Syllabus:** Introduction to regulatory bodies in the EU and US: CE, FDA etc.; 21 CFR, 510k, Medical Device Directive, Investigational Device Exemptions; Electrical isolation standards, implementation options; Laser Safety - EN 60825. Measurements in biological systems: obtaining a reference, ratiometric analysis, clinical requirements.

**Physiological monitoring:** Invasive/non-invasive, Probes - Electronic/optic, non-contact. Vital signs monitoring: ECG- Electro cardio gram, electrical function of the heart; EEG- Electro encephalo gram, electrical function of the brain; EMG- Electro myelo gram, electrical function of the muscle; Pulse Oximetry, optical measurement of arterial blood oxygen saturation; MAP-mean arterial pressure. Introduction to radiation transport in tissue: absorption/scattering theory (Mie, Rayleigh Gans), bulk scattering and bulk absorption, anisotropy, typical values for radiation transport properties, Monte Carlo modelling.X-RAY/CT: X-RAY generation and propagation, Introduction to tomography, Computed Tomography - Slicing the living human body. Ultrasound: Doppler effect, high frequency ultrasound, limitations.

**MRI/MRS:** Magnetic Resonance basics, the hydrogen nucleus, proton spin and quantum mechanics; 3D map of hydrogen atoms and hence content of the sample volume, Properties and amount of water in tissue, distinction between contrast and content imaging.

**PH6022 - REPORTING RESULTS IN PHYSICAL SCIENCE**

**ECTS Credits:** 6

**Physics**

**Rationale and Purpose of the Module:** To educate the students in the principles and practice of organizing the results of experimentation and analysis in the physical sciences and reporting the information in a format suitable for presentation at conferences and publication in the scientific literature as well as in reports, theses etc.

**Syllabus:** Structure in the reporting of results: structure of theses, papers and reports. Standard practices in presentation of scientific information: introduction, experimental, results, analysis, discussion, and conclusions.

**Standard writing practices, terminology and formatting:** titles, table and figure captions, references. Structure of textual material, sentences and paragraphs. Punctuation.

Presenting methodology of experiments: organizing and communicating the experimental details; levels of detail in reporting of procedures; essential principles of measurements and equipment; description of equipment and procedures used.

Presentation of results: quantitative results; standards in the use of graphs and tables for data presentation; accuracy and internal consistency; consistency with the relevant literature; schematics, micrographs and pictures. Quantitative analysis and mathematical descriptions. Computation and software. Conclusions.

**Grammatical issues in scientific writing.** Parts of speech. Simple, compound and complex sentences. Phrases and clauses: coordinate and subordinate clauses; adjectival, adverbial and noun clauses; prepositional, participial, gerund and infinitive phrases.

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**PI4024 - PHILOSOPHY AND ETHICS IN HEALTH STUDIES**

**ECTS Credits:** 3

**Nursing & Midwifery**

**Rationale and Purpose of the Module:** The module does to introduce students to standard philosophical and ethical approaches that guide nursing and midwifery practice.

**Syllabus:** Contemporary philosophical theories enlightening underpinning nursing and midwifery practice with particular reference to developments in such schools as existentialism; phenomenology; philosophy as therapy; understanding the body, the person (holism vs. dualism), relationships and desire; critical thinking and ethical decision-making. Theoretical approaches to ethics: deontological, utilitarian, and rights-based views. The role of oaths, declarations and codes in medical ethics; Key principles: patient, professional, duty of care, autonomy, advocacy, beneficence and non-maleficence, truth-telling, confidentiality and justice; traditional distinctions for example, between...
acts and omissions and ordinary and extraordinary means; the double-effect criterion; selected issues etc. Ethical conflicts in specific case studies, and the process of ethical decision making involved in their resolution. Issues relating to life and death arising from nursing and midwifery practice for example, i.e. the definition and medical management of death; abortion; assisted human reproduction, challenging care; physical and intellectual disabilities, those in need of intensive care; the elderly, health, the goal of therapy older person. Main traditional ethical theories (utilitarianism, deontology, virtue ethics) and contemporary advancements upon them (principism, narrative ethics, ethic of care, feminist ethics) and their relevance for practical decision making in nursing and midwifery practice.

PL4013 - COMMUNITY DEVELOPMENT
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: To provide familiarity with and critical appraisal of theories and concepts of Community Development (CD); the practice of CD in Ireland; and to evaluate the impact of community based strategies in Ireland.

Syllabus: Images and ideas of community; origins and development of CD as a field of action and study; the classical model of CD; evolving theories and concepts of CD; spatial, categorical, structural-functional and continuum approaches to the study of CD. State and community in modern Irish society; origins and evolution of CD in Ireland; consensus and conflict models of CD in the Irish context; CD and local area based development. EU; national and local strategy in respect of local and community development; CD and the "partnership process". The strengths and weaknesses of CD as a strategy of development.

PM4014 - HUMAN RESOURCE DEVELOPMENT
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This module is designed to provide students with a conceptual appreciation and practical understanding of Human Resource Development in organisations. There is a focus on integrating HRD activities with the range of HR policies and systems enacted by organisations and on perceiving HRD as a strategic organisational activity.

Syllabus: This module is designed to provide students with a conceptual appreciation and practical understanding of Human Resource Development (HRD) in organisations. There is a strong focus on integrating HRD activities with the range of HR policies and systems enacted by organisations and on perceiving HRD as a strategic organisational activity. The lectures are designed to provide students with a framework for evaluating the contribution that HRD can make to organisational functioning and for reflecting on the role that the HR practitioner plays in this scenario.

PM4008 - EMPLOYMENT RELATIONS PRACTICE
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: Explore the key operational practices in the conduct of employee relations. Examine the issue of conflict in the context of the employment relationship. Expose students to theory and practice of negotiation and conflict handling.

Appreciate the role of negotiation in the conflict resolution process. Allow for a knowledge of the key third party institutions in the context of workplace conflict resolution.

Syllabus: Understanding of sources of conflict in the workplace and possibilities for resolution; managing collective and individual issues; applying the regulatory framework to conflict issues; the nature of negotiation; integrative and distributive bargaining; strategy and tactics of distributive bargaining; negotiation planning and strategy; negotiation breakdown; communication and persuasion processes in negotiation; power in negotiation; third party intervention; analysing a moot labour court hearing; negotiation exercise and case study.

PM4028 - PSYCHOMETRICS AND PSYCHOLOGICAL TESTING
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: The aims and objectives of this module are as follows: To develop a working knowledge of assessments used in the selection of employees, including ability, aptitude and personality tests. To develop an appreciation for the appropriateness of using psychometric testing in selection and assessment of employees. To develop skills of analysing, critiquing, interpreting and designing assessments.
PM4044 - EMPLOYMENT RELATIONS: THEORY AND DEVELOPMENTS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: To outline the role of the State, Trade Unions and Employers in industrial relations. To enable students to understand the various theoretical perspectives on employee relations and develop the ability to think critically about the subject. This module will demonstrate to students that conceptual analysis has practical outcomes and consequences. It will also show the historical and economic context in which these perspectives arise and how they are made operational. Students will be able to evaluate the practical consequences of such approaches and the demands they may place on management.


PM4054 - APPLIED ORGANISATIONAL BEHAVIOUR
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: The purpose of this module is to enhance students understanding of key concepts and issues associated with behaviour in organisations. The specific objectives are to focus on the role of individual behaviour, specifically on personality, perception and motivation, and to increase students understanding of group dynamics in the international workplace, paying particular attention to the dynamics of communication, groups, conflict, and leadership. Participants will become acquainted with theories, concepts and methods through both didactic and experiential learning techniques.

Syllabus: The syllabus allows for the treatment of a small number of critical dimensions of organisational behaviour. Building on material covered in an earlier organisational behaviour module, the module explores a number of processes and issues associated with individual and group behaviour in organisations. It explores the following areas: the development of the individual: personality and individual difference, communication processes particularly in an intercultural context. Organisational leadership and organisational citizenship behaviour are also examined.

PM4064 - EMPLOYMENT RELATIONS
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: To outline the role of the State, Trade Unions and Employers in industrial relations. To enable students to understand the various theoretical perspectives on employee relations and develop the ability to think critically about the subject. This module will demonstrate to students that conceptual analysis has practical outcomes and consequences. It will also show the historical and economic context in which these perspectives arise and how they are made operational. Students will be able to evaluate the practical consequences of such approaches and the demands they may place on management.

Syllabus: The role and function of trade unions and employer organisations in a societal and comparative context. The role and operation of state institutions. Voluntary role and legalism in Irish employment relations. The practical operation of dismissals and equality legislation in the workplace. Public sector employment relations. The nature of conflict in employment relations, including strikes. National and workplace partnership, including the role and performance of national pay agreements. Recent legislation on trade disputes and trade unions. The impact of the 1937 Constitution. Contemporary national and international developments in employment relations.

PM4078 - HUMAN RESOURCE MANAGEMENT: CONTEXT AND STRATEGY
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: One of the core aims of this module is the development of students analytical and conceptual ability in the domain of HRM. The purpose of the module is to integrate knowledge and competence from other previous HR modules and from work experience and to integrate them in a way that requires students to be able to analyse key HR issues in the wider national and international context. Students will be required to critically evaluate key contemporary issues in Human Resource Management literature and to examine trends and developments in HRM/employment relations in the international and Irish context. There will be a focus on more strategic aspects of HRM

Syllabus: Introduction to course; Introduction to key concepts; Work routines; Work systems and changing priorities of production; The changing context of work; Contemporary influences on HRM; Strategy and strategic HRM; Models of strategic HRM; HRM and industry dynamics; Changing labour markets; segmentation; internal and external labour markets; flexibility and labour markets; organisational flexibility and HRM; International HRM; annual Lovett lecture; diversity; strategic HR planning; strategic rewards; performance management; live case study from Irish or international context.

PN4014 - PREPARATION AND PLANNING FOR
To introduce the student to PLCs and PLC programming.

**Syllabus:** Control systems for NC/CNC machines. Tool movement systems.
CNC machine power systems. Position control transducers for CNC machines
Sensors and their applications: proximity switches, photoelectric sensors, resistive, capacitive, and inductive sensors
Programmable logic controller hardware and software, applying programmable logic controllers to the control of manufacturing equipment.
Pneumatics - pneumatic control, pneumatic circuit design.

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**PO4004 - GLOBAL POLITICAL ECONOMY**
ECTS Credits: 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module aims to familiarise the student with the basic principles and issues in Global Political Economy (GPE). These include the theories associated with GPE and the institutions that manage it. The module, through the assignments and the tutorials, will also develop writing and oral presentation skills.

**Syllabus:** This module is divided into two sections. The first will deal with the theories used to explain the GPE (mercantilism, liberalism and critical theory) and how they interact and contribute towards the changing nature of global politics. The second will look at the institutional and governmental workings of the global economic, and discuss the context and impacts such governance has had. By the end of the course students should be able to grasp the linkages between politics and economics at the global level and be able to critically evaluate key concepts such as globalisation, the relationship between states and markets, the emergence of multinational economic actors and the role and purpose of institutions such as the World Bank, International Monetary Fund and World Trade Organisation.

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**PO4013 - GOVERNMENT AND POLITICS IN IRELAND**
ECTS Credits: 6

**Politics and Public Admin**

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

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

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**PN4318 - MACHINE CONTROL**
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** To introduce the student to open and closed loop control systems. To introduce the student to NC/CNC programming methods and CNC machine elements. To introduce the student to CNC machine power systems and position control. To introduce the student to sensors and pneumatic applications in automation.

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**PO4008 - AFRICAN POLITICS: DEVELOPMENT AND DEMOCRACY**
ECTS Credits: 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will supply an introduction to major political trends in contemporary Africa. Against a brief historical review of African state institutions since the advent of colonialism the course will explore successive efforts to modernise predominantly peasant economies, using Tanzanian experience as a case study. The factors that many critics believe have helped to contribute to the persistence and accentuation of African poverty will be assessed: these include poor macro economic management, weak institutions, and disadvantageous patterns of historically entrenched primary commodity production.

**Syllabus:** Modern African State Formation: regional contrasts
- Development from the 1930s (with a Tanzanian case study)
- African poverty: the bottom billion
- Urbanisation and urban politics
- Lagos: Structural adjustment and market reform (Zambian case study)
- Democratisation in the 1990s (Ghanian case study)
- Democratisation in the 1990s (South Africa)
- The developmental consequences of democratisation
- War and peace in Africa: Sierra Leone
- The politics of the belly: the patrimonial politics in Central Africa
- New social movements

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**PO4004 - AFRICAN POLITICS: DEVELOPMENT AND DEMOCRACY**
ECTS Credits: 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** To introduce the student to sensors and pneumatic applications in automation.

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**PO4008 - AFRICAN POLITICS: DEVELOPMENT AND DEMOCRACY**
ECTS Credits: 6

**Politics and Public Admin**

**Rationale and Purpose of the Module:** The course will explore successive efforts to modernise predominantly peasant economies, using Tanzanian experience as a case study. The factors that many critics believe have helped to contribute to the persistence and accentuation of African poverty will be assessed: these include poor macro economic management, weak institutions, and disadvantageous patterns of historically entrenched primary commodity production.

**Syllabus:** Modern African State Formation: regional contrasts
- Development from the 1930s (with a Tanzanian case study)
- African poverty: the bottom billion
- Urbanisation and urban politics
- Lagos: Structural adjustment and market reform (Zambian case study)
- Democratisation in the 1990s (Ghanian case study)
- Democratisation in the 1990s (South Africa)
- The developmental consequences of democratisation
- War and peace in Africa: Sierra Leone
- The politics of the belly: the patrimonial politics in Central Africa
- New social movements

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**PO4013 - GOVERNMENT AND POLITICS IN IRELAND**
ECTS Credits: 6

**Politics and Public Admin**

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

**Syllabus:** Historical introduction to the economic, cultural, and social background of Irish politics; economic, social and political change; Irish political culture; constitutional development; development of political parties and evolution of the party system; electoral behaviour; social bases of party support; overview of the principal political institutions, including the presidency, the Oireachtas, the Government, the Taoiseach and the civil service.
PO4015 - GOVERNMENT AND POLITICS OF THE EU
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: The module aims to develop students’ understanding of the way the European Union works and how its policy output and powers affect their lives as citizens. As a result, the module has two objectives. First, to give students a solid understanding of the history, institutions, decision-making processes and major policies of the European Union. Second, to equip students with an appreciation of the principal issues and controversies which currently face the European Union.

Syllabus: The course is divided into two main parts: The first part looks at the EU Institutions and introduces the basic theories of European integration. The second part concentrates on policies and current EU issues.

Prerequisites: PO4011

PO4032 - RUSSIAN POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: The purpose of this module is to help students explore issues in Russian political development over the last century according to their interests. Students have free choice of which topics they study so that the learning outcomes of the module will be individualized.

In addition to the knowledge gained by students about the USSR and Russia, this module will help students to develop their analytical and research skills. All students, however, will have to search out information on contemporary Russia in their own time and will learn how to locate information in the library and on the WWW, will learn how to judge the merits of different information sources, will learn how to construct arguments from primary materials that they have and how to relate such materials to existing academic literatures. They will also have to learn how to interpret academic literature in changing circumstances, to relate it to a developing policy and judge it against change.

Syllabus: This module is a reading course, students consult over and decide in consultation with the lecturer over the topics in Soviet and Russian politics that they study and write on. These topics include may include, but are not limited to: Leninism and Bolshevism as political theory

PO4048 - ISSUES IN WORLD POLITICS
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This main focus of this module is to study current themes in contemporary global politics and to understand their historical development. Students will be able to locate current global issues and place them in a wider theoretical context.

Syllabus: The module is devied into a number of subsections that engage with an area of study in World Politics and more prominently upon an issue of structural and functional importance in International Relations. The first part of the course looks at the historical development of the International system and introduces questions such as sovereignty and the concept of globalisation, whilst the second part will be made up of a collection of developments and issues that have arisen out of the current structures within world politics.

PO4102 - METHODS AND RESEARCH IN POLITICAL SCIENCE
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module will develop students knowledge of research and methods by introducing them to theory building, research design, and methods of data collection and analysis.

Syllabus: 1. The Scientific Study of Politics
2. Theory Building
3. Evaluating Causal Relationships
4. Research Design
5. Measurement
6. Descriptive Statistics and Graphs
7. Statistical Inference
8. Bivariate Analysis
9. Bivariate Regression Analysis
10. Multiple Regression Analysis

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
Reflecting on new patterns of governance. 

influence of the mediating factors.

Asses Southern Ireland.

Europeanisation as a broker of change between Northern issues.

policy, foreign policy, language policy and equality development, agricultural and rural policy, environmental namely, the economy, fiscal policy, regional institutional and administrative impact of EU membership.

The Irish public and Europe: attitudes and discourse. The relationship between Ireland Historical and contemporary interpretations of the political and policy processes .

To identify the domestic and global factors which mediated the Europeanisation process and to assess the learning and adaptation which led to changes in Ireland's political and policy processes.

Syllabus: Conceptualising and theorising Europeanisation. Historical and contemporary interpretations of the relationship between Ireland and Europe.

The Irish public and Europe: attitudes and discourse. The institutional and administrative impact of EU membership.

Domestic and global factors which mediate the impact of Europeanisation.

The effects of Europeanisation on specific policy domains namely, the economy, fiscal policy, regional development, agricultural and rural policy, environmental policy, foreign policy, language policy and equality issues.

Europeanisation as a broker of change between Northern and Southern Ireland. Assessing the impact of Europeanisation and the influence of the mediating factors. Reflecting on new patterns of governance.

Looking to the future.

Module review.

PO5006 - GRADUATE SEMINAR IN PEACEBUILDING
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: International peacebuilding has become a core activity for the United Nations and a range of other international bodies and agencies. The module will explore the different conceptions of peace involved in these activities. It will look at a range of peacebuilding interventions focusing mainly on international peace support operations. It will trace the history of dominant approaches to peacebuilding. It will show how the nature and scope of United Nations operations have changed considerably since the ending of the Cold War, and non-UN agencies such as NATO and the African Union, have gained prominence, while the range of tasks they undertake has expanded. It will also explore alternative approaches focusing on local ideas and interventions in peacebuilding.

Syllabus: How can we define peace? Concepts of negative and positive peace; the rise of the ‘liberal peace’. Theories of peacebuilding and reconciliation Dominant contemporary approaches to peacebuilding; the role of the UN Statebuilding as peacebuilding Examining the possibilities and challenges of key elements of peace support operations, including monitoring ceasefires, DDR, overseeing post conflict elections. Peace support operations in practice: evaluating impacts in cases such as El Salvador to East Timor, DRC, Sudan. The limits of international peacebuilding and the challenge of ‘hybridity’. The gendered dimensions of peacebuilding; alternatives to international peacebuilding, including indigenous approaches.

Rationale and Purpose of the Module: The module develops students’ understanding of the theories and methods used in the empirical study of International Relations. Substantively, the module focuses largely on questions of international cooperation and conflict. The module presents the main theoretical approaches to the study of interstate conflict, describes the role, functions, and decision-making structures of international organizations (with a particular focus on the EU and UN), and discusses a range of related topical issues, such as the role of trust for establishing cooperation, the democratic peace thesis, military interventions, and international terrorism.

Syllabus: The module introduces students to:
- The main theories of international conflict
- Criteria for judging the validity of theoretical arguments and the quality of empirical work
- Formal tools for theory building and data analysis commonly used in International Relations research
- The functions and decision-making structures of major international governmental organizations
- Empirical research on current topics in international cooperation and conflict

PO5008 - INTERNATIONAL POLITICAL ECONOMY
ECTS Credits: 9

Politics and Public Admin

Rationale and Purpose of the Module: The aim of this module is to provide students with a critical overview of the study of International Political Economy (IPE). It aims to explore IPE within the wider areas of International Relations, where it emerged and then show how it evolved. It will introduce students to the main theoretical approaches used within the study of IPE and look at key processes such as trade, monetary governance, development, economic crisis and resistance.

Syllabus: This module:
1) Outlines the historical emergence of the study of International Political Economy
2) Illustrates the different theoretical and methodological traditions that exist within International Political Economy
3) Analyses key functional areas such as trade, monetary governance and development
4) Looks at forms of alternatives and possible transformation of the International Political Economy
**PO5010 - GRADUATE SEMINAR IN EUROPEAN GOVERNANCE**

**ECTS Credits:** 9

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will enable students to understand the role of public administration in the multi-level system of European governance. It provides an overview of the institutional features of public administration (actors, institutions, policy process) in several European countries. The module examines the interaction between the EU and member states' administrations in the preparation and coordination of national positions in the EU policy-making process and the implementation of EU legislation. The module will further explore the explanations for institutional adaptation and innovation in the domestic politics, poilitics and policies of EU member states which are attributed to Europeanisation, globalisation, and public management reform.


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**PO50162 - FOREIGN AID AND DEVELOPMENT**

**ECTS Credits:** 9

**Politics and Public Admin**

A history of overseas development assistance since 1945 NGOs and foreign aid: historical perspectives. Forms of aid: bilateral and multilateral; emergency and developmental Foreign aid: intentions, motives, objectives and justifications The effects of foreign aid Foreign aid and conditionality Foreign aid and budgetary support to governments: implications and consequences Irish Aid and Irish NGOs: case studies

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**PO5162 - DEVELOPMENT PRACTICE AND PROGRAMME MANAGEMENT**

**ECTS Credits:** 9

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module is designed to furnish participants with an understanding of approaches to development in practice and the demands and challenges facing practitioners. It will establish the political context in which development practice is located; identify the key actors, national and international; and examine processes of development policy-making, implementation and programme management in context.

**Syllabus:** The first section will explore the implications for management arising from the growing emphasis on 'good governance' and the implications of these for bureaucracy and civil society organisations. It will explore the influence of trends in New Public Management (NPM) and the importance of institutional factors in the policy and programme management context. Section 2 will look at two different aspects of national development planning. Students will be encouraged to reflect on the relationships between different levels of policy and programme management.

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**PO5222 - GLOBAL JUSTICE**

**ECTS Credits:** 9

**Politics and Public Admin**

**Rationale and Purpose of the Module:** This module will examine contemporary and classic problems in global politics, from the perspective of political theory, focussing in particular on theories of global justice. It will explore the moral status of individuals, states and peoples; global inequality, poverty and distributive justice; theories of human rights; and the ethics of war and humanitarian intervention. Although drawing primarily on arguments in contemporary political philosophy, the module will also incorporate material from the history of political thought.

**Syllabus:** This module applies the methods of analytic political theory to both contemporary and classic problems of global politics. Topics covered fall under three broad headings. First, some of the central concepts of international political theory are analysed, including sovereignty, nationhood, territorial rights, secession and human rights. Second, rival theories of global justice are compared, including Rawlsian contractualism, cosmopolitanism, nationalism, and theories of human rights. Third, some issues in contemporary political ethics will be explored, including the prospects for global democracy, borders and migration, just war theory and humanitarian intervention.

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**PO5232 - REPRESENTATIVE DEMOCRACY IN EUROPE**

**ECTS Credits:** 9

**Politics and Public Admin**

**Rationale and Purpose of the Module:** The module examines the democratic process in European countries and the EU, focusing in particular on the linkages between the policy preferences of citizens and the public policies enacted by their representatives. Normative democratic theory tells us that such linkages are a requirement for representative democracy, but transforming citizens' preferences into public policy is far from straightforward. The module analyses and assesses this process in the European context.
This module will also be offered on the Graduate Diploma in Politics and the Structured PhD in Politics (not available for selection in section 13).

Syllabus: The module will examine the various steps involved in the process of democratic representation. Each step will be examined at both the level of European countries and the European Union; the interactions between these two levels will also be considered.

Topics include: theories of representative democracy; citizens' policy preferences; political parties; party policy platforms and party competition; policy congruence between voters and parties; the causes and consequences of unequal political participation; the determinants of voting choice; coalition formation; the enactment of election pledges; government responsiveness to public opinion.

Throughout the module, the topics will be considered in terms of normative theory (what would we want to see from a democratic perspective), predictive theory (what should we expect to see given the incentives and institutional context), and empirical evidence (what actually occurs).

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PS4012 - HUMAN DEVELOPMENT AND THE LIFE SPAN 1
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: For students to extend and deepen their knowledge of human development through the lifespan within the field of psychology. To develop skills in identifying and critically examining major tenets of psychological theory in relation to development through childhood, adolescence and adulthood.

Syllabus: This module provides students with foundation information about how psychologists have studied human development from prenatal life through childhood, adolescence and the stages of adult life including older adulthood. The course will require students to reflect critically on recent empirical studies examining human development through these life stages. The course will focus on the topics of cognitive, biological, social and moral development, from the field of psychology. These topics are studied from a lifespan perspective.

Prerequisites: PS4032, PS4031

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PS4032 - PSYCHOLOGY AND SOCIAL ISSUES
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: This module will explore a range of contemporary social issues bringing to bear upon them the methods and theoretical perspectives of psychology in an attempt to better understand their causes and consequences. Using the social issue as a focus, students will gain insight into the discipline of psychology and engage in debating and evaluating the theory and method of psychology. Through a psychological analysis of the causes and consequences of social issues students will gain insight into how these issues might be resolved.

Syllabus: Issues covered will include: the media and human behaviour; social conflict; the use and abuse of power; sex and sexuality; society and mental health; social inclusion and exclusion; bullying at work; equality and advocacy; parenting and childcare; the environment

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PS4042 - PSYCHOLOGY: THEORY AND METHOD 2
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To cover the main paradigms, concepts, issues, and debates in the core areas of cognitive psychology and developmental psychology. To develop students' research and data analysis skills, specifically through the use of experimental methods and inferential statistics.

Syllabus: This module is the second of two which provide coverage of the main paradigms, concepts, issues, and debates within the core areas of psychology. The section detailing developmental psychological will cover the main theoretical approaches to the study of human development from prenatal and childhood. Biological development to theories of socio-emotional development across the lifespan. The section on cognitive psychology will cover the basic cognitive models of memory and thinking. The key debate of the utility and limitations of the metaphor of 'the brain as information processor' will be common to both areas. In the laboratory classes, students will be required to employ basic principles of experimental design; data entry and analysis using SPSS; probability testing and inferential statistics.

Prerequisites: PS4011

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PS4047 - SOCIAL PSYCHOLOGY 2
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To build upon previous introductory modules in social psychology by providing comprehensive in-depth coverage of the core areas of the subdiscipline as well as alternative critical perspectives

To introduce students to more advanced epistemological and methodological debates in the subdiscipline as well as to historical and cultural variations in social psychological research.

Syllabus: Social psychology is a 'broad church' in terms of the values, theories and methods applied across the subdiscipline. More than other areas of psychology it also reflects the contemporary concerns and values of the societies in which it occurs. The purpose of this module is to provide students with a more indepth knowledge of the core topics of social psychology, but also to put these topics in their socio-political and historical context and to critically evaluate psychological research from different epistemological and methodological grounds. Topics will include: advanced group processes; intergroup conflict; discursive social psychology; measurement in social psychology; critical perspectives in social psychology.

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PS4052 - PRACTICAL PSYCHOLOGY 2
ECTS Credits: 6

Psychology

Rationale and Purpose of the Module: To develop students understanding of the range of laboratory based activities in psychology and to provide
opportunities for students to undertake practical studies in psychology and in so doing develop student/ES ability to collect, code and analyse empirical data.

Syllabus: This practical class introduces the range of methods employed in psychology to students. The value of experiments, observational, survey and interviews and case studies work are considered using illustrative examples. Practical skills in the experimental and survey methods are developed though the use of selected examples. Students are encouraged to become increasingly familiar with SPSS for coding of data and simple inferential statistics are introduced.

PS4108 - APPROACHES TO SOCIAL IDENTITY
ECTS Credits: 6
Psychology
Rationale and Purpose of the Module: For students to develop an understanding of the different theoretical approaches to the study of social identities in psychology as compared to those in other disciplines
To introduce students to the range of epistemologies and methodologies employed in social psychological research and to outline the implications of these for the discipline of psychology more generally.

Syllabus: The Social Identity approach in social psychology originated in an interdisciplinary effort to explain large-scale intergroup conflict. Drawing upon sociology, social anthropology and social cognition it aimed to provide a comprehensive account of intergroup relations from the individual perspective to the group level. However, in the four decades since its inception the Social Identity approach has become overwhelmingly cognitive and experimental in focus and lost links with other disciplines and methodologies. This module places the Social Identity perspective in its historical context and introduces students to cognate theories and methods elsewhere in social psychology and in other disciplines with a view to enriching their understanding of social psychology. Topics include: evolution of the Social Identity approach; advances in Self Categorisation Theory; discursive approaches to social identities; ethnography and displays of identity; approaches to national identity.

Prerequisites: PS4011

PS4138 - HEALTH PSYCHOLOGY
ECTS Credits: 6
Psychology
Rationale and Purpose of the Module: to introduce students to the rapidly developing field of health psychology, to highlight the importance of a biopsychosocial approach to understanding health and illness. and to improve students understanding of the role that behaviour plays in determining health and illness.

Syllabus: Health Psychology is a sub-discipline of relatively recent origin in psychology, but is rapidly developing a unique identity. Whilst having some concerns in common with clinical psychology- health psychology is concerned with both mental and physical health and in particular their inter-relationship- it is quite distinct from that discipline. Its range of interest is wide and continues to develop, but the discipline by its nature is interdisciplinary, requiring the study of variables at the biological, psychological and social levels. It is an area that is often controversial, reflecting in part, the methodological and conceptual problems inherent in a subject straddling several disciplines. Topics covered include Models of health behaviour, stress, psychoneuroimmunology

Prerequisites: PS4042, PS4021

PS6062 - ADVANCED PERSPECTIVES IN SOCIAL IDENTITY RESEARCH
ECTS Credits: 6
Psychology
Rationale and Purpose of the Module: The aim of this module is develop students understanding group levels of analysis in social psychology and how this has been informed by social identity and self categorisation theories. This module will make particular attempts to apply these theoretical approaches to contemporary social issues.

Syllabus: The module will give an overview to traditional social identity theory and later developments in the self categorisation approach. Particular emphasis will be placed on theoretical advances in the field over the last two decades emphasising the emotional components of identity, the strategic use of identity and the multidimensionality and multiplicity of identities. We will cover applications in the areas of health psychology, organisational psychology, and clinical psychology. The overall emphasis in discussing these topics will be on social change and improving personal well-being.

PT4004 - INTRODUCTION TO QUALITY MANAGEMENT
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: The aim of the module is to give an effective and functional overview of Quality Management. It will: 1. Introduce the student to the basic concepts of Quality Management; 2. Inform the student about the role that quality plays in the workplace and impact that quality has on the organisation as a whole; 3. Make the student aware of the how to implement a range of quality strategies and tools.


PT4008 - DELIVER AND RETURN WITHIN SUPPLY CHAINS
ECTS Credits: 6
School of Engineering
Rationale and Purpose of the Module: This module is the third in a stream.

There is a need to appreciate the external operational landscape and the complexities that arise in the multiplicity of processes encountered in international logistics operations. This takes in the processes of getting materials between suppliers facilities, intermediate production facilities and onwards to
customers. These processes are subject to incessant disturbances, and also demands from myriad bodies governmental and commercial, with considerable uncertainty and risk components, yet customers expect a smooth supply of their regular products on time, to agreed high quality and sustainability standards, and economically, as if nothing else matters. Framing these activities and applying them to configure and operate supply networks and to optimise their contribution to performance tradeoffs is the subject of this module. In the context of the Supply-Chain Operations Reference (SCOR) model these concepts lie in the domain of Deliver and Return activities.


Optimisation: MS Solver add-in, most profitable mix of products subject to constraints of capacity, market, and material availability.

Decision philosophy: continuous improvement PDSA, evidence-informed decisions, scale of scientific evidence used in healthcare delivery.

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PT4012 - DECISION SUPPORT TOOLS
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To prepare students to take an active part in developing IT systems that reflect the needs and priorities from their working perspective.

To apply some elementary programming and information handling concepts in the context of technology management.

Syllabus: Spreadsheet basics: MS Excel, cell attributes (number, character formats), relative/absolute, formulas functions inc arithmetic, trig, conditional), row/column calculations, configuring charts (category data line/bar, scatter plots, primary/secondary axes, formatting), row/column calculations, functions (sum, sumproduct, statistical, financial), linking between worksheets, add-ins, pivot tables, macros.

Spreadsheet automation: macros, visual basic for applications MS VBA, conditional looping and branching, vector (list) and matrix (array) lookup.

Applications to observation and data analysis for building an evidence base: experimental observations (1) continuous variables (time), work hard versus work smart experiment, t-test to compare outcomes (manual and excel function). (2) binary attribute variable (present/absent), occurrence sampling, confidence intervals, chart on number line. (3) associative relationship: linear regression curve-fitting, trendline fit to observed data, extension to non-linear regression-based models.

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PT4014 - PLANT AUTOMATION
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To introduce the student to industrial sensors and their applications in automation.

To introduce the student to fundamental control systems within automation.

To outline the various types of hardware elements within a production environment.

To provide the student with the ability to control and monitor data flowing to and from a production line - LABView software.

To introduce the student to programmable logic controller hardware and software.

To introduce the student to material transportation systems used within industrial environments.

Syllabus: Introduction to Automation Basic elements of an automated system, networks, interfacing and levels of automation within the manufacturing plant. Open Vs Closed loop systems Hardware: Sensors types and applications, correct selection, Analogue to Digital Converters, Digital to Analogue Converters, encoders, logic gates, Boolean algebra, signal conditioning. Programmable Logic Control Siemens PC based, Mitsubishi code, ladder logic, timers, counters, industrial applications and uses. LabVIEW Continuous monitoring of data, graphical user interface, control of systems, programming language, industrial applications and uses. Material Transportation Systems Material handling, transport equipment, AGVs, conveyors, design of systems, rating of systems, SMEMA control. Material storage systems, retrieval systems, carousels. Automated Identification: Bar-coding, 1D barcode, 2D barcodes, Radio Frequency ID, smart sensors. Linked to production control and warehousing.
learning from prior modules into a whole-systems perspective, through the application of operations theory to case questions in specific domain areas. This is a capstone module.

**Syllabus:** Differentiation between production, manufacturing and service activities. Analysis of case examples linked back to theory of supply chain operations in specific domains, as follows. Systems dynamics phenomena: Forrester-Bullwhip effect and explanation (Beer game or similar eg mortgage game), in eg a service environment. Supply chain operations reference model SCOR, and SCE implementation framework, in eg a global high technology supply chain case context. New service development, including service encounter and service quality, in eg a franchise casse context. Capacity and demand management, including forecasting and yield/revenue management, in eg a health service case context. Waiting time management and capacity planning in variable time and demand environments, eg airport or health service design case context.

**PT4112 - MANUFACTURING TECHNOLOGY 2**
ECTS Credits: 6

School of Engineering

**Rationale and Purpose of the Module:** To introduce the student to a further range of manufacturing and fabrication processes and the relationship between materials and processes. To emphasise the importance of accuracy and precision.

**Syllabus:** Engineering measurement.
- Length standards.
- Standard measuring temperature.
- Process Capability.
- Quality and Accuracy.
- Machining - further consideration of sawing, turning, milling, drilling.
- Fundamental treatment of the shear plane - relation between the rake angle and the shear plane and implications for power requirements.
- Workholding - methods of clamping, magnetic workholding, chucks and collets.
- Welding techniques including: manual metal arc, oxy-acetylene, MAGS and TAGS welding.
- Brazing, soldering and adhesive bonding.
- Mechanical joining.
- Joint design.

Introduction to engineering materials and their properties.

**Prerequisites:** PT4111

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**PY4046 - PEDAGOGY OF DANCE / GYMNASTICS 2**
ECTS Credits: 3

**Physical Education & Sport Sciences**

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**PY4068 - PHILOSOPHY, ADVOCACY AND PHYSICAL EDUCATION**
ECTS Credits: 6

**Physical Education & Sport Sciences**

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**PY4078 - YOUTH SPORT AND POLICY**
ECTS Credits: 3

**Physical Education & Sport Sciences**

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**PY4102 - INTRODUCTION TO FUNDAMENTAL MOTOR SKILLS**
ECTS Credits: 3

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** Fundamental motors skills are foundational to participation in physical activity for a lifetime and engagement with more complex sport forms. The purpose of this module is to equip students with the skills, knowledge, and attitude regarding fundamental motor skills to enhance their participation and that of others.

**Syllabus:** Fundamental motor skills are generic motor activities with specific observable patterns. They encompass one stage in motor skills development, occupying a place between rudimentary movement skills and the development of sport specific skills. This module will examine the development of selected fundamental motors skills. The fundamental motors skills to be included are those considered to be critical to the majority of future participation.

Specific content will include:

1. Development of competence
   a. Locomotor skills (walk, run skip, gallop, leap, hop, slide)
   b. Throwing
   c. Catching
   d. Sticking with the hand
   e. Kicking
   f. Jumping (horizontal and vertical)
   g. Landing
   h. Balance (static and dynamic)
   i. Rolling

2. Identification of critical elements of selected fundamental motor skills
   a. Feedback
   b. Analysis

3. Importance of fundamental motor skills
   a. Participation
   b. Social competence
   c. Attitude
   d. Self-confidence

4. Overview of issues with teaching
   a. Time
   b. Feedback
   c. Environment

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**PY4112 - PHYSIOLOGY AND ANATOMY AND PEDAGOGY OF HRA**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** This course is a unique opportunity to become familiar with key concepts in kinesiology, the study of human movement, and physiology, the study of how the body functions. It will also examine the role of physical activity (PA) and related themes (link with sport, health, etc.), while particular emphasis will be placed on the role of Health-Related and Skill-Related Fitness (HRF / SRF) in Physical Education (PE). To enable students to understand the basic anatomy of the musculo-skeletal system and how the system functions in normal motion such as walking gait. To enable students to understand the basic physiology of the systems which support movement in the body.

Apply the concepts to a physical education/activity environment.
**Syllabus:** Anatomical terms and definitions. Identification and functions of the musculo-skeletal system. Structure and type of bones and muscles. Kinesiological analysis of simple joint movements and analysis of posture. Forms of motion. The nervous system and the brain. The peripheral nervous system; the autonomic and somatic nervous systems. Structure and function of muscle fibres; organisation into motor units; Motor unit recruitment in muscle contraction. Functional properties of muscle. The circulatory system; structure and function of the heart; blood vessel structure and function; blood pressure and its measurement. The respiratory system; structure and function of the upper respiratory tract, the lungs, pulmonary ventilation, and pulmonary gas exchange. Practical application will include an introduction to the concept and application of fundamental movement skills, in addition to the various components of HRF & SRF; principles of training specific to HRF and PF; and field tests for physical fitness. Principles of effective measurement and personal experience of field tests for both; warm up and cool down procedures; health appraisals and screening; components of physical fitness (PF); principles of training specific to HRF and PF; and field tests for physical fitness. Principles of effective measurement (validity, reliability, safety, objectivity, etc.) will play a key role throughout this course and this will become particularly evident during physical assessments and testing. Students will also be introduced to the concept of a personal profile and all related issues that combine to create such a synopsis of an individual’s physical status (assessment results, change over time, training log, etc.).

**PY5021 - EVIDENCE BASED PRACTICE**
ECTS Credits: 12

**Clinical Therapies**

**Rationale and Purpose of the Module:** This proposed module is a distance eLearning format of PY5021 which will permit students to opt either to complete a module on evidence based practice via lectures and tutorials on campus in semester 2 of the academic year, or by eLearning in Semester 1. Module PY5021 Evidence based practice is a mandatory requirement for the post graduate certificates offered by the Department of Clinical Therapies. The module equips students with the skills and knowledge to adopt evidence based practice (EBP). High quality service provision requires that the most current relevant research is combined with experiential learning and service users preferences. This module will enable students to source and critically appraise the research, reflect on their practice and synthesise this knowledge to address service requirements. The students will also gain an understanding of the barriers and facilitators in implementing EBP in the workplace.

**Syllabus:** Introductory day on campus to ensure students are able to access and use electronic resources. Series of keynote topics delivered on-line and supported by a discussion forum, group work and tutorials on the different facets of EBP; defining a service question, searching for and appraising the most current literature, integration and synthesis of information to address service needs and the implementation in practice. Evaluation of changes in work practices.

**RE4006 - SPATIAL ROBOTICS**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module covers a broad range of the necessary enabling and advanced technologies required for the design, integration and operation of Modern Robots including industrial robotic arms and mobile robots.


Positioning And Navigation, Position Estimation, Trajectory Following.

Advanced topics: Robot arms: Payload analysis, Jacobians, Quaternions, Dynamics. Robot navigation: Explicit incorporation of uncertainty in Robotic Systems design, parametric approaches stochastic models of uncertainty, Kalman Filter design, specification and implementation.

Prerequisites: ET4224

**RE4017 - MACHINE VISION**
ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces students to one of the key enabling technologies that is necessary for modern robotics design, machine vision. At the end of this module students will be able to use common techniques for the design, specification and practical implementation of modern vision systems.


**RM4002 - RESEARCH METHODS IN LANGUAGES, LITERATURE AND CULTURAL STUDIES 2**
ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** This module introduces students to the academic study of languages, literature and cultural studies, with a specific focus on the theoretical approaches used in languages, literature and cultural studies. The module provides training in essential research skills, equipping participants to pursue self-directed study, to individually research a topic, to apply the appropriate tools and methods of research, to source and use primary archival materials, and to present findings appropriately. The aims of the module are:
SE4006 - SCIENCE TEACHING 3
ECTS Credits: 6

School of Education

Review of the Senior Cycle Science syllabuses (Biology, Agricultural Science, Chemistry, Physics, as appropriate); structure and rationale for the syllabus; Structures of subject knowledge; innovation in the classroom/laboratory/workshop; curriculum development; justification for inclusion of the subject on the curriculum; mixed ability teaching; alternative approaches to assessment; varieties of teaching/learning styles; classroom/workshop/laboratory organisation; international perspectives; cross curricular aspects.

SE4034 - INTRODUCTION TO SCIENCE PEDAGOGY
ECTS Credits: 6

Biological Sciences

SN4022 - SOCIAL SCIENCES 2: SOCIOLOGY OF HEALTH AND ILLNESS
ECTS Credits: 6

Nursing & Midwifery

Rationale and Purpose of the Module: This module introduces students to basic sociological concepts and models of understanding in relation to health and illness. Students will be expected to develop an understanding of social factors that influence health status, as well as an understanding of how sociology may be relevant to understanding of the social contexts of healthcare policy and health work.

Syllabus: Sociological models/theories of health and illness; social factors (especially gender, ethnicity and class) affecting health chances; socio-cultural health beliefs and research on chronic illness; illness-related stigma; theories of professionalization; gender and power relations; 'sick role' theory. Social context of health care provision: healthcare policy (historical and contemporary context); equity and healthcare structures; professionalization of nursing and midwifery; social power of medicine; healthcare division of labour; changing relationship between nurses and doctors. Social context of health care for clients: access to services professional-patient relationships. Contemporary politics of health care: crisis in welfare; crisis in health care; social implications of health care policy; changing context of health work.

SO4008 - SOCIOLOGY OF MEDIA AUDIENCES
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: The purpose of this module is to introduce students to the emerging area of media audiences. It is built around a number of key issues and concerns that exist around studying media audiences and will address the significant theories and debates on media audiences. Emphasis will also be placed on the development of practical audience research skills which students will be asked to demonstrate and apply to the tasks outlined in their course assignments.

Syllabus: Working from a sociological perspective, this module will document the changing theoretical and methodological paradigms that the study of media audiences has gone through and the impact that these frameworks have had on the nature of research produced and knowledge acquired about the composition and abilities of media audiences in an increasingly media saturated society. The impact of such processes as globalisation, politics and the public sphere, the rise of popular entertainment, the internet and the recent explosion of new media products (e.g. online/offline gaming, Facebook, MySpace, Twitter, and YouTube), and the study of media fans will be discussed. Overall it is hoped that students will become more reflexive about their media usage and develop a new level of understanding about the role that media consumption has on their daily lives.

SO4032 - INTRODUCTION TO SOCIOLOGY 2
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: This module aims to better acquaint students with the discipline and field of sociology, including the work of contemporary sociologists, and to provide them with strong foundation of knowledge in preparation for further sociology modules. In addition to enhancing students awareness and understanding of key sociological theories, concepts and issues, this module is oriented to developing students contexts and their articulation with other major social divisions such as class, sexuality, ethnicity and race.
ability to use sociology as an analytical tool. Finally, this module also seeks to promote valuable skills in critical thinking, writing, referencing, and research.

**Syllabus:**

- An introduction to deviance, crime and control.
- Crime Statistics
- Sociological approaches to explaining crime
- Sanctions
- Prison
- Concepts of race and ethnicity
- Manifestations of diversity
- Representations of race and ethnicity in the media.
- Racism and public attitudes towards cultural diversity, minorities and immigrants
- An introduction to the sociology of religion
- Secularisation
- Civil Religion and Invisible religion
- Social class
- The continuing relevance of class
- Class, consumption and identity
- Class, cultural capital and consumption

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**SO4036 - CONTEMPORARY SOCIOLOGICAL THEORY**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:**

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

**Syllabus:**

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

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**SO4046 - QUANTITATIVE METHODS FOR SOCIOLOGICAL RESEARCH**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:**

This module considers quantitative research in relation to sociology. This module aims to develop students' knowledge gained in SO4053 to increase and deepen their understanding of and facility with quantitative research methods; particularly to develop their facility in the analysis of quantitative data. The primary objective of the course is to ensure that students are able to understand and use basic quantitative methods. The course begins by reviewing the role of quantitative methods in sociology, with consideration of the theoretical implications of the method and the sorts of research it permits. It then moves on to a practical core, introducing basic techniques for data collection, processing, presentation and statistical analysis. The lectures run in parallel with lab sessions, in which students use SPSS and other relevant software.

**Syllabus:**

This course introduces students to the basic statistical analysis of social data, including simple descriptive statistics and presentations, samples, surveys and elementary probability theory, inferential statistics, bivariate measures of association and multivariate techniques including an introduction to linear regression and correlation. The class will provide the practical skills to analyse and draw conclusions from quantitative social science data. Emphasis will be placed on understanding, computing and interpreting basic statistics; interpreting and evaluating survey research findings; and analysing quantitative data with statistical software programmes such as SPSS.

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**SO4078 - INEQUALITY AND SOCIAL EXCLUSION**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:**

The aim of the module was to introduce the students to the dynamics and processes implicit to inequality and social exclusion. Further, to make them aware of the complexity of the conceptualisation and operationalisation of equality and social exclusion. At the end of the module, students will be able to apply their understanding of both concepts to key substantive areas in Irish society.

**Syllabus:**

The key focus and aim of the module is to provide students with a conceptual and operational understanding of the dynamics of inequality and social exclusion. Students will be familiarised with debates, definitions and theoretical frameworks pertaining to both inequality and social exclusion. Specifically, the module will focus on the Irish context as it seeks to examine the structural, cultural and ideological dynamics underpinning inequality and social exclusion and their implications for individuals and groups. It will introduce students to the central approaches to measuring inequality and social exclusion. Key will be a focus on the relationship between poverty, inequality and social exclusion. A central theme across the substantive areas covered will be the exploration of the continued significance of class, gender, sexuality, ethnicity, disability, and racial divisions as bases for both social exclusion and inequality. Additionally, the module will examine the impact of media texts with particular reference to media discourses about those who are excluded. Finally, the module will refer to institutions and agencies engaging with the above themes.

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**SO4088 - SOCIOLOGY OF GLOBALISATION**

**ECTS Credits:** 6

**Sociology**

**Rationale and Purpose of the Module:**

a. To provide an opportunity for the student to examine of key
theoretical perspectives and central debates relevant to the study of globalisation
b. To offer ways of evaluating the work of major sociological schools/theorists in the study of economic, cultural and political globalisation.
c. To develop the ability to analyse and evaluate various outcomes of globalisation through a critical framework.

Syllabus: The aim of this course is to provide a comprehensive introduction to the various discourses of globalisation. It will explore some of the key meanings, history and differing theoretical perspectives and interpretations of globalisation in contemporary research, and will identify main policy issues related to economic, cultural and political globalisation. The focus will be the development of transnational communities and cultures including emergent new forms of worldwide political protest; the challenge for trade unions; culture and the `globaland `localdivide; the possibilities for a future global society or culture; the inter-meshing of local-global interests and identities; the inequalities and social exclusion generated by economic globalisation; and the extent to which sociology like other disciplines needs to re-think many of its central concepts, debates and theoretical approaches in the light of globalisation processes. The analysis and discussion will be illustrated with international and Irish case studies.

SO4108 - SOCIOLOGICAL APPROACHES TO GENDER AND MULTICULTURALISM
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: To provide students with a theoretical framework for understanding the social, political and intellectual meanings of gender and multiculturalism in the Global North; to present feminist critiques of different approaches to multiculturalism; to familiarise students with the development of multiculturalism and its gendered effects within particular national and transnational contexts.

Syllabus: The syllabus will include theories that account for multiculturalism as a top-down response to cultural difference which produces a reification of ` cultureand gender. It will also examine theories that identify multiculturalism as a new way forward to a ` politics of recognition and progressive gender politics. Examples of gendered cultural practices that raise critical questions for the effectiveness of multiculturalism, such as polygamy, forced marriage, female genital mutilation, unequal access to health care, education and rights of ownership will be examined. The course will consider how multiculturalism is reshaping the public spheres and civil societies of the West with particular implications for women and for gender relations. The module will be driven by questions relating to the relationship between gender, cultural diversity and global capitalism; how multicultural approaches to social cohesiveness re-conceive belonging in gendered ways; and how gender relations affect and are affected by multicultural strategies for negotiating difference.

SO4118 - SOCIOLOGY OF GENDER AND POPULAR CULTURE
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: a. To provide an opportunity for the student to examine of key theoretical perspectives relevant to the study of gender and popular culture.
b. To offer ways of evaluating the work of major sociological schools/theorists in the study of popular culture and gender studies.
c. To develop the ability to analyse and interpret popular cultural texts through the lens of gender analysis.

Syllabus: This module explores the twin themes of bodies and sexualities in the spaces of contemporary Western culture. Utilising a range of popular cultural forms, sites and events which are most accessible- television, cinema, magazines; households, shops and workplaces; and popular understandings of medicine, science and technology the module involves students in a series of critical engagements. The module addresses a number of issues; why the subjects of sexualities and the body become the focus of so much interest across a broad range of disciplines; How we an de-naturalise and problematise normative gender categories by setting gendered identities in cultural contexts; What important contributions have been made to the field by recent work on masculinities; How the practices of everyday life can be interrogated to yield insights about the relationships between the body, gendered identities and prevailing cultural norms.

SO4208 - SOCIOLOGY OF LOVE AND ITS DARK SIDE

ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: This module examines the different aspects of relationships: love, mate selection and dating, non-marital lifestyles, marriage, reproduction and forms of parenting. A key component of the course is the influence of changing work patterns and changing sexual values and behaviour on increasing diversity in family forms.

The objectives of this module are:
* To introduce students to the sociological perspective as it applies to the understanding of relationships and familial phenomena.
* To present various sociological theories regarding love, sexual relationships, marriage and family systems.
* To familiarise students with the results of empirical research of social scientists who study partnership formation and family behaviour.

Syllabus: The module explores a number of key themes: Trends in family formation and their competing theories; classifications and functions of the family especially in relation to Ireland, past and present; love, sex and courtship, exploring issues of partner choice; marriage and cohabitation, addressing the effects of cohabitation on both nuptiality and fertility; lone-parenting, various paths into and problems faced; separation and divorce, exploring trends across social groups and their correlates; re-marriage and stepfamilies with a particular focus on growing up in a step-family; work and families, analysing power relations within the family in terms of gender roles and housework by discussing a range of contemporary studies of the domestic division of labour especially the impact of increasing male unemployment, the crisis of masculinility, the new man, dual burden/triple shift and the relationship between home and work; the family, state and social policy: the role of social policy and the declining family.

Prerequisites: SO4073, SO4001

SP4002 - INTRODUCTION TO LATIN AMERICAN CULTURE/S
ECTS Credits: 6

School of Modern Languages and Applied Linguistics
Rationale and Purpose of the Module: First year students majoring in Spanish need to have a general but solid knowledge of the main socio-political processes in Latin American history and their effects on and interaction with literary and film production, as well as other forms of culture, as background for further modules and as part of their overall achievement within this programme.

Syllabus: The development of Latin American culture has been marked by its multicultural and multi-ethnic history. The arrival of the Spanish Conquistadors had a massive effect in Latin American cultures and civilizations. From 1492 onwards, the construction of Latin American identities are characterised by the encounter and interaction of indigenous and African cultures and the influence of the Hispanic tradition. In order to explore the development of Latin American culture, the module will pay special attention to a number of themes, from the Amerindian civilizations to the literary boom of the 1960s, Magical Realism, and the importance of women's artistic production.

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SP4132 - SPANISH FOR BEGINNERS 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America.

The course is designed to:
* Enable the student to understand and use basic structures of Spanish grammar.
* Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish.
* Foster autonomous language learning skills.
* Introduce the student to Spanish and Latin American cultures.
* Develop listening and speaking skills in Spanish.
* Equipping the student with basic writing skills.

Syllabus: Lecture: introduction to contemporary Spanish and Latin American cultures and societies. These include: transculturation and indigenous cultures in Latin America; contemporary Spanish and Latin American literature, basic concepts of Spanish linguistics.

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Tutorials and lab: working with set text-book, back-up audio-visual and online materials, students are introduced to past tenses, pronominal verbs and more complex structures in the Spanish language.

Prerequisites: SP4131

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SP4134 - SPANISH FOR LEGAL STUDIES (BEGINNERS)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Students within the BA in Law and European Studies who take Spanish as their foreign language benefit from a module that gives them an overview of the Spanish legal system and basic legal terminology. Students will compare the Irish legal system to the Spanish legal system and will acquire basic knowledge of Spanish legal terminology.

Syllabus: Extracts from newspapers and magazines, dealing with topical issues specifically related to the field of law in the Hispanic world- will be selected for reading comprehension and other related language work, developing a critical view through discussion. A selection of audio and video material will be used for oral and aural skills facilitating integration of all language skills.

Practice of new grammatical aspects of Spanish will also be included.

A class will be devoted to introducing, practising and improving the use of specific grammatical areas such as the past tenses and the introduction of the subjunctive in Spanish.

Prerequisites: SP4131

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SP4142 - SPANISH LANGUAGE AND SOCIETY 2
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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

Syllabus: The course is designed to:
* Revise and broaden the student's knowledge of the structures of Spanish grammar.
* Improve pronunciation and patterns of intonation in Spanish.
* Further develop the student's language skills by exposing them to different situations and registers, both formal and informal.
* Foster autonomous language learning.

Prerequisites: SP4114

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SP4146 - MODERN AND CONTEMPORARY SPAIN
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Consolidation of the structures, functions and vocabulary taught in the first and second years and expands grammatical competence to include complex use of the subjunctive. Further development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the interaction between Spain, Europe and the wider world.

Syllabus: Tutorials: Working with set textbook, complementary audio-visual material, as well as advanced literary texts.

Prerequisites: SP4133, SP4143, SP4134, SP4934

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SP4148 - MEDIA AND CURRENT ISSUES IN THE SPANISH SPEAKING WORLD
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin American cultures and societies.

The course aims to provide the student with:
* A selection of audio and video material will be used for oral and aural skills facilitating integration of all language skills.
* Practice of new grammatical aspects of Spanish will also be included.
* A class will be devoted to introducing, practising and improving the use of specific grammatical areas such as the past tenses and the introduction of the subjunctive in Spanish.
* Foster autonomous language learning.

Prerequisites: SP4131

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To equip the student with basic writing skills.

To introduce the student to Spanish and Latin American cultures.

To foster autonomous language learning skills.

The course is designed to:

Expand the student's range of Spanish vocabulary.

Revise and broaden the student's knowledge of the structures of Spanish grammar.

Improve pronunciation and patterns of intonation in Spanish.

Further develop the student's language skills by exposing them to different situations and registers, both formal and informal.

Foster autonomous language learning.
Linguistics

Rationale and Purpose of the Module: By the end of this module students should:

* have developed further their understanding and command of Spanish grammar, vocabulary and usage.
* have improved their ability to use Spanish fluently and accurately and to make brief presentations in the language.
* have the ability to identify some of the characteristics of a variety of styles and genres, particularly in the area of media language.
* have a greater awareness of issues in translation and an enhanced ability to translate a variety of text types from Spanish to English and vice versa, particularly in the area of media language.
* understand more about a variety of issues of central importance to Spain and/or Latin America, with particular reference to the media and to other key aspects of language and society.
* have developed a critical understanding of an extended example of modern Hispanic fiction.

Syllabus: The programme is centered around a variety of topics of relevance to students of Spain and Latin America. The intention is to provide variety but a theme running through a substantial part of the module is that of the media and communication. Additionally, there will be attention given to questions of democracy, violence and the rule of law, as well as issues of gender in contemporary society, particularly with reference to the media.

Prerequisites: SP4147

SP4232 - SPANISH LANGUAGE, CULTURE AND SOCIETY 2 (BEGINNERS)
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The beginners course aims to provide the student with a strong basic knowledge of Spanish and of contemporary Spain and Latin America. The course is designed to:

* Facilitate the student’s understanding of various aspects of Spanish culture.
* Enable the student to use basic structures of Spanish grammar.
* Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish.
* Expose the student to a range of contemporary Spanish and Latin American cultures.
* To foster autonomous language learning skills.
* To introduce the student to Spanish and Latin American cultures.
* To develop listening and speaking skills in Spanish.
* To equip the student with basic writing skills.

Syllabus: Lecture: introduction to contemporary Spanish and Latin American cultures and societies. These include: transculturation and indigenous cultures in Latin America; contemporary Spanish and Latin American literature, basic concepts of Spanish linguistics. Tutorials and lab: working with set text-book, back-up audio-visual an online materials, students are introduced to past tenses, pronominal verbs and more complex structures in the Spanish language.

Prerequisites: SP4231

SP4242 - SPANISH LANGUAGE, CULTURE AND SOCIETY 2A
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The course is designed to:

* Revise and broaden the student’s knowledge of the structures of Spanish grammar.
* Expand the student’s range of Spanish vocabulary.
* Improve pronunciation and patterns of intonation in Spanish.
* Further develop the student’s language skills by exposing them to different situation and registers, both formal and informal.
* Facilitate the student’s understanding of various cultural aspects within the Spanish-speaking world.
* Foster autonomous language learning.

Syllabus: The advanced course consists of four hours of Spanish per week:

* Two language tutorials (grammar, vocabulary, communication skills, writing and reading skills).
* One laboratory/oral class (oral communication skills).
* One General Lecture

Prerequisites: SP4241

SP4246 - SPANISH LANGUAGE, CULTURE AND SOCIETY 4
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Consolidation of the structures, functions and vocabulary taught in the first and second years and expands grammatical competence to include complex use of the subjunctive. Further development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the interaction between Spain, Europe and the wider world.

Syllabus: Tutorials: Working with set textbook, complementary audio-visual material, as well as advanced literary texts.

Prerequisites: SP4243, SP4233

SP4248 - SPANISH LANGUAGE, CULTURE AND SOCIETY 6
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: By the end of this module students should:

* have developed further their understanding and command of Spanish grammar, vocabulary and usage.
* have improved their ability to use Spanish fluently and accurately and to make brief presentations in the language.
* have the ability to identify some of the characteristics of a variety of styles and
genres, particularly in the area of media language.

* have a greater awareness of issues in translation and an enhanced ability to translate a variety of text types from Spanish to English and vice versa, particularly in the area of media language.

* have a developing awareness of issues in liaison interpreting and an ability to interpret a variety of text types from Spanish to English and vice versa, particularly in the area of media language.

* understand more about a variety of issues of central importance to Spain and/or Latin America, with particular reference to the media and to other k

Syllabus: The programme is centered around a variety of topics of relevance to students of Spain and Latin America. The intention is to provide variety but a theme running through a substantial part of the module is that of the media and communication. Additionally, there will be attention given to questions of democracy, violence and the rule of law, as well as issues of gender in contemporary society, particularly with reference to the media.

Prerequisites: SP4247

SP4628 - WOMEN'S NARRATIVES OF RESISTANCE IN THE HISPANIC WORLD
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Aims & Objectives:
To develop the students knowledge of different literary modes in 20th-century Hispanic culture. To introduce students to political and testimonial women's writing in the Hispanic World. To develop the students' understanding of different literary and political discourses. To further develop students' analytical skills, with a special focus on political women's writing.

Syllabus: The module will concentrate on the exploration of women’s narratives of resistance to power in different textual modes, from testimony to literature, in order to study the different ways in which women have experienced and represented the oppression/repression of dissidence in colonial, neo-colonial and authoritarian regimes in Latin America and Spain.

Prerequisites: SP4003

SP4934 - SPANISH FOR LAW STUDENTS (ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Students within the BA in Law and European Studies who take Spanish as their foreign language benefit from a module that gives them an overview of the Spanish legal system and basic legal terminology. This module will help students:
- To consolidate and further develop productive and receptive language skills at an advanced level.
- To facilitate students' understanding of legal terminology used within the Spanish legal world.
- To develop basic translation skills of legal documentation from Spanish into English: contracts, wills, powers of attorney, etc.

Students will compare the Irish legal system to the Spanish legal system and will acquire certain knowledge of Spanish legal terminology.

Syllabus: A series of articles from newspapers, magazines, journals, textbooks and the Internet dealing with topical issues specifically related to the business in the Hispanic world will be selected for text analysis and as source material for essay writing. A selection of audio and material recorded on DVD will be used for oral and aural skills. Course work included preparation of CVs and letters of presentation when looking for a job. Simulation of job interviews with special attention to the use of formal language and negotiation of working conditions.

Prerequisites: SP4143

SP4914 - SPANISH FOR BUSINESS 4
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The module aims to prepare students to communicate effectively and confidently when using Spanish in a Spanish or Latin American working environment and to give them an overview of the organisation of public administration, national firms and some relevant economic issues in Spain and other Spanish speaking countries.

Syllabus: A series of articles from newspapers, magazines, journals, textbooks and the internet dealing with topics specifically related to the field of law in the Hispanic world will be selected for text analysis and as source material for essay writing. A selection of audio and material recorded on DVD will be used for oral and aural skills. A debate class in groups will facilitate integration of all related language skills. A variety of topics relating to issues in legal ethics, i.e. human rights, euthanasia, death penalty and terrorism will be discussed.

- A class will be devoted to practise and improve the students' command of Spanish concentrating on difficult grammatical areas and the pragmatics of the language.
- Basic translation of legal documentation from Spanish into English.

Prerequisites: SP4143
SP6012 - ISSUES IN CONTEMPORARY SPAIN AND LATIN AMERICA
ECTS Credits: 9

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To arrive at an understanding of key issues in contemporary Spain and Latin America through the study of societal, political and cultural developments and to enable students to analyze these issues in a comparative framework. The module further aims to enable students to engage at a postgraduate level in written and oral debate on contemporary issues in Hispanic society. As a first semester module, it also offers students analytical and discursive skills in contemporary Hispanic issues which will aid them in the second semester modules in the programme in which this module is offered.

Syllabus: This course will involve a thorough analysis of current socio-cultural and political developments in contemporary Spain and Latin America. It will explore the interplay between society, culture and politics on various levels, e.g. the political ramifications of cultural production; the study of cultural politics; the cultural dimensions of power and/or the study of power and politics in recent examples of Spanish and Latin American culture. Students will be given seminars on topics such as contemporary social movements in Spain and Latin America, cinema and culture in the Hispanic world and politics and power in Spain and Latin America. Research papers shall then be undertaken by students which will address the above issues and enhance their analytical understanding of the processes of contemporary Hispanic societies.

SS4012 - EXERCISE AND HEALTH FITNESS FOR PHYSIOTHERAPISTS
ECTS Credits: 6

Physical Education & Sport Sciences

SS4013 - PSYCHOLOGY OF MOVEMENT DEVELOPMENT FROM INFANCY TO ADOLESCENCE
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To advance the students’ knowledge and understanding of psychological development from infancy to adolescence from both motor development and psychosocial perspectives

Syllabus: MOTOR SKILL DEVELOPMENT
Motor development as a part of human development; motor development as (a) a process and (b) as a field of study. Descriptions of the phases of motor development from infancy through adolescence to adulthood (reflexive, rudimentary, fundamental skills, sport specific skills) noting the changing characteristics. Factors influencing motor development (growth, maturation, genetics (nature), environment (nurture); historical overview of theories to explain motor development with focus on the maturation perspective of 1930s and more recent dynamic systems theory; influences of the individual, the environment and task demands. Methods of investigation. Concepts of direction of development, readiness, critical/sensitive periods. Motor development in infancy, childhood and adolescence; early and late developers, implications for teaching and coaching. Importance of a developmental philosophy. Perception and perceptual development with focus on vision. Balance and its development. Evaluation of stimulation and perceptual motor training programmes at various phase of development.

PSYCHO-SOCIAL DEVELOPMENT
This module aims to develop a fundamental knowledge and understanding of how developmental issues from childhood to adolescence can influence participation and performance in sport and physical activity. This module will include content relating to youth sport participation and development including models of development in sport; the influence of significant others, stages of development, motivation and participation in sport, and burnout and dropout in sport. This module will compare and contrast readiness for youth sport competition from the biological, social, cognitive and psychological perspectives. The module content will consider psychological considerations of participation in sport and physical education from childhood to adolescence and will critically examine current practices in this area. This module will also critically consider best practices in this area based on research from youth sport and motor development, specifically addressing issues such as long term participation patterns, competition, and program characteristics.

SS4142 - SCIENTIFIC PERSPECTIVES OF SPORT AND EXERCISE PSYCHOLOGY
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The module aims to introduce key theoretical and applied concepts in sport and exercise psychology. In addition the module will provide a foundation in the methods, issues and application in sport and exercise psychology.

Syllabus: Psychology as a scientific discipline and mode of enquiry to investigate the mind and behaviour. Major concepts studied in psychology (e.g. personality, motivation, stress, attention, perception, memory, learning, nervous system). Methodologies employed in psychology and the changing scientific paradigms. Evolution of sport and exercise psychology.

Psychological skills training, Psychology of physical activity and health. Relevance of psychology to sport coaching and participation in physical activity. Psychology and skill acquisition. Professionalisation of the discipline and applications.

SS4198 - EXERCISE PSYCHOLOGY
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: The aim of this module is to provide students with a critical understanding of theories, concepts and practice in exercise psychology.

Syllabus: This module will study the brain, cognition, emotion and behaviour in physical activity in both physical activity and exercise setting. The core topics of study will include the key concepts and theories, exercise and mental health, and the psychology of physical activity behaviour. It will also include hot topics under contemporary issues which will comprise half of the module.

SS4204 - SUPPORT SYSTEMS TO MUSCLE CONTRACTION
ECTS Credits: 6
Physical Education & Sport Sciences

Rationale and Purpose of the Module: The energy requirements of exercising muscle are carefully regulated and supported by fuel and oxygen delivery and the removal of waste products including heat. The purpose of this course is to provide an understanding of the regulation and adaptation of cardiovascular and pulmonary function in response to exercise. An experimental laboratory component provides an opportunity to challenge theoretical concepts by empirical analysis and to competence in measurement techniques.


Prerequisites: SS4202

SS4332 - INTRODUCTION TO BIOMECHANICS FOR SPORT AND EXERCISE
ECTS Credits: 3

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Module created due to restructure of Year 1 of the BSc Sport and Exercise Sciences programme. Originally this module (SS4304) was a week 1-15 6 ECTS module and is now being changed to a week 7-12 3 ECTS module to suit the restructure.

Syllabus: Introduction to segmental modelling techniques including cadaver dissection data. Centre of mass centre of pressure, centre of gravity and radii of gyration. Fluid mechanics and air flow effects with applications to cycling, skiing, and aquatics. Friction. Angular momentum. Stability & balance. Analysis of specific movements; including Walking and running, diving, throwing and striking skills, jumping and throwing and sprint start.

SS4405 - SPORTS INJURIES
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: To develop an understanding of the causes and immediate treatment of sporting injuries, and to take adequate steps to prevent and minimize the incidences and extent of sport injuries.

Syllabus: Syllabus
* The incidence and causes of sports injuries; risk factors and mechanisms of injury.
* Classification of soft tissue injuries, body response to trauma, phases of tissue healing.
* A review of the most common sports injuries.
* Application of first aid principles to injuries, use of RCES in first handling of injuries, E.A.P., procedures for referral to medical/other agencies.
* Goals of sports rehabilitation, components of rehabilitation programme.
* Prevention and rehabilitation of injuries through the application of stretching and strengthening exercises, sports massage and the aquatic environment.
* Overview of the modalities used in the treatment of sports injuries.
* Rehabilitation programmes for specific injuries, functional progressions, guidelines for return to sport.

Students explore how to operate within an organization, e.g. minutes, meetings and time management, planning, budgeting, promoting, sponsorship, safety and legal aspects, running the event, media, legal and ethical aspects and evaluation.

Coaching: Planning, delivery and evaluation of phases of a single session, and of a number of sessions. Coaching, experience gained by placement of students with mentor coaches or exercise leaders in an ongoing practical setting. Maintenance of a coaching and reflective log.

Exercise Prescription: Specific case studies of asymptomatic participants for health related activity and sports specific training. Health appraisal, knowledge of participants goals, selection of appropriate field tests, assessment and evaluation of field tests, programme design for six weeks, delivery of programme, ongoing monitoring of participant and programme, post programme evaluation, guidelines for future work.

Prerequisites: SS4403
SS4418 - CLINICAL APPLICATIONS OF EXERCISE  
ECTS Credits: 6
Physical Education & Sport Sciences
Rationale and Purpose of the Module: This module is designed to provide students with an appreciation of the techniques and approaches used in designing and applying exercise interventions in specific clinical conditions. The aim is to allow students to apply aspects of physiology and applied exercise science to understanding the treatment / prevention of disease.

Syllabus: The course begins with a structures review of the evidence for benefits of exercise and health. Practical aspects of exercise prescription, including pre-participant screening, components of exercise prescription, outcome measures and progression. The course covers the application of exercise in the following conditions: people with: neuromuscular disorders, with a focus on multiple sclerosis; cardiorespiratory disorders, including COPD and myocardial infarction; vascular disease, with a focus on peripheral arterial disease; osteoporosis; learning disorders, focusing on autistic spectrum disorder; pregnancy.

Prerequisites: SS4202, SS4203

SS4422 - EXERCISE AND FITNESS  
ECTS Credits: 3
Physical Education & Sport Sciences
Rationale and Purpose of the Module: To provide students with a foundation and understanding of effective prescription of exercise/physical activity for health and sport performance.


SS4552 - SPORT AND EXERCISE SCIENCES - IMMERSION  
ECTS Credits: 9
Physical Education & Sport Sciences
Rationale and Purpose of the Module: This module introduces students to the application of a multidisciplinary approach to understanding activity in sport and exercise contexts through the provision of examples of human performance and endeavour. It provides an introduction to sports biomechanics, exercise and health fitness and the application of psychology. It explores a multi-disciplinary approach to thematic issues within the scope of exercise, biomechanics and psychology.

Syllabus: Key concepts in sport and exercise psychology and basic concepts in skill acquisition. Revision of basic mechanical concepts but with special reference to sports examples: forms of motion, linear and angular kinematics and kinetics. Differentiation of video data by finite differences. Projectiles: importance of angle, speed and height of release/projection and distance travelled and applications in sport. Construction of generalised link segment models for digitising video. Process raw data and perform basic kinematic calculations. Effective use of movement analysis software. Terms and key concepts in exercise science and physical activity.

SS6042 - STRENGTH SPORTS  
ECTS Credits: 6
Physical Education & Sport Sciences
Rationale and Purpose of the Module: This module aims to provide opportunities to develop knowledge and understanding of the principles and theories of strength and conditioning practice, and their application to a variety of sports and performance-based settings. The module content will be drawn from a broad base of research theory and applied methodologies that currently form the basis of contemporary strength and conditioning practice. Additional content will focus on developing proficiency in the fundamental performance aspects of strength training.
such as Olympic Weightlifting and aspects of complex training. This module will also provide video and notational analysis workshops, as well as coaching feedback methodologies, which will be delivered through lectures, lab sessions and student centred learning. Aspects of nutrition for elite performance in this field will also permeate throughout the module content. Ethical issues as they relate to the field of strength and conditioning training will also be addressed.

Syllabus: Principles and theories of strength/conditioning practice; application of this to a variety of sports and performance-based settings; muscle anatomy, group names and physiology; bone and connective tissue; research theory and applied methodologies in strength and conditioning practice; developing proficiency in the fundamental performance aspects of strength training; fundamental strength/conditioning training; stability and balance methods; Olympic Weightlifting; programme design and implementation; safety issues in strength/conditioning training; testing protocols and administration; provision of video and notational analysis workshops; critical analysis of performance technique through video analysis; coaching feedback methodologies; nutrition for elite performance; current concepts in performance nutrition; issues as they relate to the field of strength and conditioning practice; research theory and applied methodologies in strength and conditioning training will also be addressed.

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**TE40012 - ENGLISH AS A FOREIGN LANGUAGE 2 (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.

The following grammatical areas are covered: second and third conditionals, passive voice, gerunds and infinitives, reported statements, reported questions and commands, quantifiers, articles lexis e.g phrasal verbs, strong adjectives, ed/ing adjectives, some uses of get, noun formation, compound nouns, frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

**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: second and third conditionals, passive voice, gerunds and infinitives, reported statements, reported questions and commands, quantifiers, articles lexis e.g phrasal verbs, strong adjectives, ed/ing adjectives, some uses of get, noun formation, compound nouns, frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

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**TE4025 - TEACHING ENGLISH AS A FOREIGN LANGUAGE 1 (ALL)**

**ECTS Credits:** 6

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** To provide students with an introduction to the Teaching of English to Speakers of Other Languages (TESOL). This is the first of a three-module suite, and starts with an overview of the main approaches and methods in language teaching and learning, the different theories of language and language learning and the concept of learning styles. To enable students to comprehend theoretical aspects of the grammatical and phonological aspects of the English language relevant for teaching purposes. To enable students to develop an understanding of the different levels of language competency of English language learners.

This is the first of a three-module suite, students also complete TE4025 (TEFL 1), TE4026 (TEFL 2) and TE4028 (TEFL 3). The roll out of this new stream of TESOL modules will not affect students currently completing the TEFL suite of modules, and they will exit with a TEFL certificate. New entrants in the academic year 2014/15 will start the new TESOL suite of modules.

**Syllabus:** The module integrates three independent but related components:

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

**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; future forms, wishes and regrets, defining and non-defining relative clauses, noun clauses, adverb clauses, perfective and progressive aspect, gerunds, infinitives. Lexis: discourse markers, phrasal verbs, collocations, British vs American English.

**TW4116 - Workplace Issues in Technical and Professional Communication**

ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** To develop an awareness of the social context in which technical and professional communicators work, and the responsibilities associated with the provision of content, considered from ethical and legal perspectives; To develop students’ writing skills especially in the area of writing for online media; To develop students’ online information design skills; To develop students’ ability to design and write for online media, especially blogs and web sites.

**Syllabus:** Ethical issues in professional communication; codes of practice; legal issues (consumer protection, patent, copyright, trademarks, trade secrets, contract). Writing for new media; web design; information design for special needs; trends in technical communication. Communication models; communication problems; non-verbal communication; intercultural communication; work teams; interviewing skills; presentation and listening skills Dreamweaver and Captivate.

**TW4118 - Content Development and Information Management**

ECTS Credits: 6

**School of Culture and Communication**

**Rationale and Purpose of the Module:** To provide students with information on the project management and quality issues in a content development environment, along with practical issues concerning indexing and editing. To give students an introduction to instructional design and e-learning. To give students an opportunity to put their learning into practice through a project which incorporates e-learning and project management. To introduce students to multimedia tools used in content development.

**Syllabus:** This module has two strands: documentation management and instructional design. The documentation management strand covers: managing complex documentation projects, tools for project management, quality, developing a style guide, editing and indexing, the review process. The instructional design strand covers: learning theories, needs assessment, audience analysis, objective analysis, media specifications, course design, performance assessment, and delivery systems.

**TX4407 - CORPORATE TAXATION**

ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:** This module aims to provide a detailed understanding of the principles underpinning the computation of the liabilities of companies to Corporation Tax, VAT and Capital Gains Tax. To compute corporate tax liabilities, including the utilisation of available reliefs such as Research and Development and relief for losses. To understand Close Company legislation and related liabilities. To understand the residency rules for corporates, including relevant international tax planning. To understand the tax implications of business incorporation and related planning.

**Syllabus:** This module covers: The advantages and disadvantages of incorporation of a business; the principles underpinning the taxation of Irish companies, computing tax liabilities on trading income, non-trading income and capital profits. Payment of tax and filing of returns. Tax relief for investment in Research and Development (R&D). Relief for losses, including terminal loss and Group relief. Close company legislation and the consequences of Close Company status. An introduction to Capital Gains Tax, both for individuals and companies. Computation of gains and use of losses. An introduction to Value Added Taxation (VAT). Overseas aspects of Company taxation. A review of selected case law and topical issues of relevance to company taxation in Ireland.

**Prerequisites:** TX4305

**WT4014 - INTRODUCTION TO GEOLOGY AND SOIL MECHANICS**

ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** This module introduces the most common material encountered in the construction industry by exploring soil mechanics beginning with the fundamentals in civil engineering geology. The course is designed to challenge the student to seek the key concepts in geology and soil mechanics and apply these concepts in projects and self-directed learning to achieve the following key objectives:

To provide a clear understanding of the role of geology and soil mechanics in achieving a successful construction project.

To form the basis for subsequent modules on Soil Mechanics and Geotechnical Engineering Design.

To generate enthusiasm for the subject through field trips, practical experimentation and case histories.

**Syllabus:** PART I The Earth and its formation; plate tectonics; physical and chemical processes; erosion and deposition; Quaternary geology; Rock types; igneous, sedimentary, metamorphic; geological maps and
School of Engineering

Rationale and Purpose of the Module: To introduce students to the microstructure and macrostructure of wood and wood growth.
To understand the basic failure modes of wood and wood products.

Syllabus: Tree growth, production of woody tissue. [Silviculture] practice establishment, management, harvesting. 
[Macroscopic] nature of wood. [Microscopic nature of wood], cell wall, hardwood, softwood. [Chemistry of wood], cellulosics, lignin, extractions. [Factors affecting wood quality]: [Chemical]: degradation [Biological]: growth, wood variants, reaction, juvenile, bark, foreign organisms, fungi, insects, marine. [Mechanical]: processing defects

WT4107 - PULP, FIBRE AND BOARD MANUFACTURE 1
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: To integrate the combination of wood and its reconstruction into wood products, in terms of process, properties and end uses.


WT4208 - BUILDING SERVICES 2
ECTS Credits: 6

School of Engineering

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to the more complex building services and equipment being adopted in modern non-domestic buildings. It is also an aim to introduce the student to key elements of services design for buildings. This module builds on the learning of WT4504
* Introduction to building services in non-domestic construction including both active and passive services.
* Understand design, build and operation implications of these services.
* Have good knowledge of water installations to multi-storey buildings
* Understand the essentials of electrical and gas distribution and supply
* Identify the principle fire fighting equipment needs for modern buildings
* Understand the principles of providing appropriate lighting within buildings

WT4202 - DESIGN STUDIO
ECTS Credits: 6
**Syllabus:** Heating and air-conditioning services: energy performance measurements using, SBEM and NEAP; heating and air conditioning, temperature drop through structures; gas supply and distribution, gas controls, ventilation ducts and fans, solar heating, heat pumps and bio-mass.  
* Hot and cold water services: Pipe sizing for hot and cold water multi-storey buildings, force and pressure, hydraulics.  
* Drainage services: sustainable urban drainage, retention tanks, soil separation, green roof, grey water recycling  
* Electrical services: electrical terms and installations, supply and distribution of electricity, supply controls, protection, conductor and cable rating, methods of wiring and distribution systems, single phase power circuits; electrical installations in large buildings; site electricity, electric space heating  
* Access services: lifts, escalators and service ducts, automatic control.  
* Lighting services: integration with electric light, natural lighting, artificial lighting, design of lighting, lighting controls  
* Safety services: classification of fire risks, safety devices, heating and flues; sprinklers, risers and hose reel installations, dry and wet risers; portable and fixed extinguishers, automatic fire detectors, alarms and dampers, pressurisation of escape routes, automatic fire ventilation fire detection, security systems.  
* Electrical services: supply to non domestic buildings micro generation (solar and wind)  
* Data services; audio visual, broadband and telephony.

**Prerequisites:** WT4401

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**WT4502 - CONSTRUCTION TECHNOLOGY**  
**ECTS Credits:** 6  
**School of Engineering**  

**Rationale and Purpose of the Module:** This module builds on the material covered in WT4401 through applied practical coursework based on residential construction practice. The course emphasises best industry practice and is framed around the relevant legislative instruments governing residential construction in Ireland.

**Syllabus:**  
* Site selection and analysis for residential construction & addressing engineering, planning and Irish architectural heritage and conservation.
* Soil identification, properties and behaviour û factors affecting drainage & foundation choice.  
* Concrete technology and mix design.  
* Environmental considerations in residential construction û sustainable technologies for waste disposal and energy.  
* Introduction to housing estate development and planning applications.  
* Interpretation of construction drawings.  
* Trouble shooting residential building problems via case histories.

**Prerequisites:** WT4401

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**WT4504 - BUILDING SERVICES 1**  
**ECTS Credits:** 6  
**School of Engineering**  

**Rationale and Purpose of the Module:** The aim of this module is to provide a comprehensive introduction to building services and associated technology:  
* Understanding of principles, applications and implications of these services.

**Syllabus:**  
* Heating and air conditioning services; district heating, heat loss calculations, thermal insulation, ventilation, air filters, heat recovery systems; principles of air conditioning, duct and convector air conditioning systems, DEAP.  
* Hot and cold water supply services; low, medium and high pressure hot water heating.  
* Drainage services; below ground drainage systems, pipe materials and pipe laying, soakaways, drain testing and inspection.  
* Waste services; soil and waste systems, modified single stack and ventilated stack systems; resealing and anti-siphon traps, air pressure in discharge stacks; irrigation systems, sewage pumping, refuse disposal systems; sewage disposal, settlement tanks, bio-filters.

**Prerequisites:** PH4032

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**WT4604 - LAND SURVEYING**  
**ECTS Credits:** 6  
**School of Engineering**  

**Rationale and Purpose of the Module:** To provide the student with an opportunity to express a professional expertise in executing an independent body of work.

**Syllabus:**  
* Evaluation of initial solution, development and modification of same. Preparation of final brief which includes analysis, developments, solutions and conclusions.

**Prerequisites:** WT4407

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**WT4608 - PROJECT 2 WOOD SCIENCE**  
**ECTS Credits:** 6  
**School of Engineering**  

**Rationale and Purpose of the Module:**  

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**WT4704 - BUILDING MEASUREMENT**  
**ECTS Credits:** 6  
**School of Engineering**  

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**Rationale and Purpose of the Module:** The overall aim of this module is to illustrate measurement techniques and procedures for buildings and associated works.

**Syllabus:** Setting down dimensions, alternative systems, applied mensuration, general rules for taking-off; measuring substructures, excavations, formwork areas, various foundation types and measurement; walls, floors, concrete, blockwork, masonry, partitions and suspended ceilings; internal surface finishes, dry linings, roofs, structural elements, roof finishes and coverings, waterproofing; internal finishes, windows, doors, staircases, fixtures and fittings; reinforced concrete structures, columns, beams, slabs, formwork, concrete finishes, reinforcement, precast elements; structural steelwork; structural timber, standard joinery components; plumbing, fittings, mechanical and electrical installations; drainage, underground and above ground, external works, roads, pavings, earthworks and groundworks, landscaping; demolitions, alterations and renovations.

**WT4804 - ESTIMATING AND COSTING**  
ECTS Credits: 6

**School of Engineering**

**Rationale and Purpose of the Module:** The overall aim of this module is to introduce some standard estimating and costing techniques that apply to building construction works.

**Syllabus:** Organisation of the estimating function, estimating methods, project appreciation, enquiries to suppliers and tender planning; resource costs, unit rate pricing, sub contractors, fluctuations; provisional sums, preliminaries, cashflow forecasts, completing the estimate, tender submission and follow up; impacts of new developments on estimating, new procurement methods, target cost estimating, gain share, negotiations and development of incentives; value engineering and developing value for money solutions.

**WT4968 - SAFETY IN TECHNOLOGY CLASSROOMS: LEGISLATION & PRACTICE 2**  
ECTS Credits: 3

**School of Education**

**Rationale and Purpose of the Module:** To develop the knowledge, skills, values and attitudes necessary to ensure the appropriate management of safety by the teacher in the technology teaching environment at second level. A deeper understanding of the statutory instruments and other regulations that apply to the management health and safety in the technology teaching environment at second level. An ability to execute the procedures associated with the creation and maintenance of a safe and healthy learning environment.