University of Limerick
Provisional Module Booklet - Spring Modules
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 - 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 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.


Threat of moral hazard: Agency theory, resource dependence, stakeholder theory. International and cultural dimensions to business ethical behaviour. Recognise business ethics as an element of corporate citizenship and sustainability; appreciating that corporate compliance is a cornerstone for corporate social responsibility. Bushman on corporate transparency, Bentham and Kant on utilitarianism, Lonergan on professional judgement. Roarty on language, Blackburn on truth.

Prerequisites: AC4001, AC4004, AC4305

AC4024 - FINANCIAL ACCOUNTING AND REPORTING
ECTS Credits: 6

Accounting & Finance

Rationale and Purpose of the Module: The aim of this module is to develop a students 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.

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.

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**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

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**AR4002 - DESIGN STUDIO 1B**

**ECTS Credits:** 15

**School of Architecture**

**Rationale and Purpose of the Module:** The aim of First year Design Studio is to enable the student to become an active participant in the architectural design process. The field of architecture is broad and the methodologies used to work within it varied. In addition, architecture interacts closely with a number of related disciplines.

First year Design Studio exposes the student to the types of thinking and acting inherent in this process with the objective of helping the student become conversant with the process and capable of developing initial architectural projects.

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

By working through the project, the student will become exposed to the architectural design process, a new and complex process for most first-year students. Each project introduces a different aspect of the architectural design process in order to help the student develop a range of methods of working.

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

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

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

**Prerequisites:** AR4001
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. The architectural project must - through their design projects and their 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.

The pedagogical focus is on developing, in each student, a capacity to interrogate the project through different inputs and to push the project ahead. At the end of the semester the student should have developed an architectural project by interrogating a range of inputs through disparate means and successfully resolved these.

Syllabus: An agenda will be set in Design Studio. The basis for all propositions will have stated intent relative to societal ideas of place, collectivity and socio-economic (or political) meaning. The architectural project brief will have inherent complexity, embodying personal space together with public space.

Through the detailed study of architectural references, a concept of `now¿ relative to the past history of societal and architectural ideas will inform each student's proposition since both will be researched and presented in parallel. The material realisation of these social and cultural concepts is capable of conveying meaning in a contribution that the strictly functional provision of buildings does not make.

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

Prerequisites: AR4005

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AR4006 - DESIGN STUDIO 3B
ECTS Credits: 15

School of Architecture

Rationale and Purpose of the Module: The principal aim of Third-Year Design Studio is to enable the student to demonstrate a first synthesis of the disparate influences that go to make up an architectural project using the range of skills and tools an architect is required to use. The emphasis in the second term is on developing a project to a high level of detailed design. The pedagogical focus is on developing, in each student, a capacity to interrogate the project through different inputs and to push the project ahead. At the end of the semester the student should have developed an architectural project by interrogating a range of inputs through disparate means and successfully resolved these.

Syllabus: An agenda will be set in Design Studio. The basis for all propositions will have stated intent relative to societal ideas of place, collectivity and socio-economic (or political) meaning. The architectural project brief will have inherent complexity, embodying personal space together with public space.

Through the detailed study of architectural references, a concept of `now¿ relative to the past history of societal and architectural ideas will inform each student's proposition since both will be researched and presented in parallel. The material realisation of these social and cultural concepts is capable of conveying meaning in a contribution that the strictly functional provision of buildings does not make.

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

Prerequisites: AR4005

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AR4008 - DESIGN STUDIO 4B
ECTS Credits: 18

School of Architecture

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
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:
(d) Materials in the studio and in a site context.
(e) Materials used in structural design and their relevant components
(f) Design and build in model form a bridge with calculated design loads and span.

AR4022 - REPRESENTATION / DRAWING 2
ECTS Credits: 3

School of Architecture
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:

Studio based exercises will, by degrees shift their focus from training the craft of technique in drawing toward using drawing as an analytical and representation technique. Colour, composition, documentation of different sites û with some visits to specific sites -, typography and basics of graphic design will be subjects of the course. Ink and pastels will be introduced as drawing materials, wood, plexiglas and metals as model making materials.

The idea of transformation introduced in the first semester of the course will be extended to include digital media. Learning how digital media operates and is distinct and different from activities of drawing and model making photoshop and powerpoint will be the first steps into digital representation.

Architectural drawing, line-drawings of floor plans, sections and details, will become more concrete, will develop from freehand to hard line drawings following the convention of architectural drawing in respect of line types, hatching, representing materials, dimensioning, lettering and grade of detailing depending on scale.

AR4024 - REPRESENTATION / DRAWING 4
ECTS Credits: 3

School of Architecture
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

AR4026 - REPRESENTATION / DRAWING 6
ECTS Credits: 3

School of Architecture
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 Architecture
Rationale and Purpose of the Module: to expand studentsÆE 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. Just as students need to learn to describe a site and objectify their reactions to it, as architects it is essential that they also learn to discuss buildings at a high level. Seminars will address Skin, Program, Circulation, Structure, and Codes, introducing both historical and contemporary material to challenge students. Throughout, students will explore architectureÆEs intersection with the material and social realms. As in the first semester, students will undertake close readings of the most significant works in modern and contemporary architecture. Projects likely to be discussed will include Joseph PaxtonÆEs Crystal Palace, Otto WagnerÆEs Postparkasse, Mies van der RoheÆEs 860-880 Lake Shore Drive and Seagram Buildings, Le CorbusierÆEs La Tourette, Eero SaarinenÆEs IBM Headquarters, Bernard TschumiÆEs Parc de la Villette, FOAÆEs Yokohama Terminal, MVRDVÆEs WoZoCos Housing Project. Readings by authors such as Robin Evans, Colin Rowe, Anthony Vidler, Otto Wagner, Alan Colquhoun, Le Corbusier, and Walter Gropius will explore the diverse ways by which buildings can be discussed. We will visit nearby sites first-hand in order to learn how to read buildings. Afternoon workshops will focus on
describing these sites. The writing projects introduced in the fall semester will be built upon in order to ensure that students have a high degree of skill in thinking about architecture through writing by the end of the term. This course will be teamed with a series of workshops by Elizabeth Hatz that will introduce students to ways of attaining close readings of buildings through drawing.

**Prerequisites:** AR4031

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

**School of Architecture**

**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 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

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**AR4042 - ASSEMBLY AND TECHNIQUES 2**  
ECTS Credits: 3

**School of Architecture**

**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.

**Prerequisites:** AR4032

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**AR4046 - ASSEMBLY AND TECHNIQUES 5**  
ECTS Credits: 3

**School of Architecture**

**Rationale and Purpose of the Module:** The aims of this class are:
- to introduce students to making a comprehensive set of working drawings of a third year design studio project.
- to develop further the student’s own intuitive skills in technique alongside knowledge of available construction technology today.
- to introduce students to the Irish Building Regulations
- to carry out a dissertation on a construction system of personal interest

**Syllabus:** Developed principles of assembly and techniques will be further studied concurrently with the production of a full set of working drawings.

**DRAWING EXERCISE:** Each weekly exercise will concentrate on developing one technical aspect of a building. The culmination of the term will be that each student would have completed a comprehensive set of working drawings.

**LECTURE COURSE:** A weekly lecture will introduce students to developed construction principles, systems
and methods. Students will be asked to choose a construction system/method at the start of the year. Each student will complete a short dissertation on the chosen topic for the end of the module.

DIARY OF A BUILDING: Students will be assigned a building of appropriate complexity at the start of the year. Fortnightly supervised visits will be made to the building site.

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. Understanding comfort in terms of the cultural and social relations that influence its affect.

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 buildings environmental performance.

Prerequisites: AR4051

School of Architecture

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: AR4053

School of Architecture

AR4058 - PROFESSION AND SOCIETY
ECTS Credits: 3

School of Architecture

AR4068 - ADVANCED CONSTRUCTION 2
ECTS Credits: 3

School of Architecture

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

Syllabus: Architecture students learn best by imagining, developing and realising (full-scale) prototype structures through which ideas can be tested, documented and communicated.

Through actual engagement in all the stages of making and building, students have a unique opportunity to develop a rich experiential understanding of architecture. Closely related to Design Studio, Advanced Construction informs and supports the students individual design studio projects; directed and independent research on advanced construction is applied to these projects. Students test radical and experimental alternatives to the conventional processes of building because architecture is facing unprecedented pressure to reinvent itself in response to a new set of economic and environmental realities. The responsibility to preempt the needs of future built environments demands new approaches. The modules provide an overview of advanced building construction at an industrial scale and with respect to contemporary, emerging and innovative technologies. Students study the design implications of new construction technologies, and investigate precedents and potential applications.
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: The purpose of this module is to further enhance the command of practical strategies which students can apply to the development of particular language skills and to the improvement of their ability to engage in autonomous learning, with an increasing focus on listening and reading skills. This module is also directed towards helping students to consolidate and expand their repertoire of appropriate learning styles and strategies, building on the foundation provided by their first module. A comparative/contrastive approach will continue to be used in the area of grammar, with an increasing focus on somewhat more complex aspects of morphology, syntax, etc.

Syllabus: The aspects covered will be:
- Practical use of language-learning strategies to adopt for different language skills, in particular as regards receptive skills. The latter will involve the incorporation of some basic techniques of discourse analysis.
- Consolidation of Spanish pronunciation and its relationship to orthographic conventions.
- Grammatical points which will be covered include:
  - basic past tenses and their most common uses
  - irregular and radical changing verbs
  - the fundamental differences between the indicative and subjunctive moods

This will be accompanied by increasing attention to the nature and characteristics of the Spanish lexicon.

Prerequisites: AS2301

AS2402 - INTRODUCTION TO ENGINEERING
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

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

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 UniversityÆs 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. 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.

BC4002 - INTRODUCTORY BIOCHEMISTRY
ECTS Credits: 6

Chemical & Environmental Science

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


**BC4008 - IMMUNO AND DNA DIAGNOSTIC TECHNIQUES**
**ECTS Credits:** 6

**Chemical & Environmental Science**

**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 & Environmental Science**

**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 & Environmental Science**

**Rationale and Purpose of the Module:** To present an overview of (a) animal cell culture and (b) pharmaceutical biotechnology in the context of underlining 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. 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 & Environmental Science**

**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.

**Syllabus:** The structure of DNA and other nucleic acids. The molecular concept of a gene... DNA sequencing. The central dogma - DNA makes RNA makes Protein. Processing of DNA -Replication, transcription and
translation. The relationship between DNA and Protein is the genetic code. Eukaryotic and prokaryotic systems. Control sites and elements within DNA. Gene expression are the lac operon. Review of Protein structure, amino acids peptides primary, secondary and tertiary structure of proteins. 3D structures and their representation. Functionality of proteins, Strategies of protein purification and assay. Protein sequencing and analysis. Enzymology, the nature of enzymes, their classification and activities. Enzyme kinetics and catalysis, enzyme inhibitors. Mode of action of enzymes -lysozyme on peptidoglycan.

Prerequisites: BC4903

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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 currency 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.

**Prerequisites:** BY4001

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**BY4004 - HORTICULTURE**  
**ECTS Credits: 3**  

**Life 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-level teachers of biology, the necessary skill and knowledge to be able to teach genetics confidently, competently and imaginatively at secondary level.


**Prerequisites:** BY4002, BY4006

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

**Life 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-level teachers of biology, the necessary skill and knowledge to be able to teach genetics confidently, competently and imaginatively at secondary level.


**Prerequisites:** BY4002, BY4006
BY4016 - ANIMAL PRODUCTION SYSTEMS  
ECTS Credits: 6  

**Life 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  
    - Sheep 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 cows; milking machine and milking parlour operation; housing and handling facilities for dairy cows.  
  - Pig Production  
    - Breeds 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:** BY4001, BY4002, BY4003

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BY4208 - AGRICULTURE 2  
ECTS Credits: 6  

**Life 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 production; Health and welfare; Ruminant nutrition and growth; Feedstuffs  
  - Food evaluation and feeding standards; Anatomy, physiology and control of mammalian reproduction; Sheep production; Beef production; Dairy herd management; Dairy science, anatomy, physiology and control of lactation; Pig and poultry production.

**Prerequisites:** BY4001, BY4002, CH4102

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BY4214 - PRINCIPLES OF HUMAN NUTRITION  
ECTS Credits: 6  

**Life 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 function, metabolism and food sources as well as discuss the latest research in the role of nutrition for the promotion of 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 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  

**Life 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.

**Syllabus:**  

**Prerequisites:** BY4003

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BY4104 - ECOLOGY 1  
ECTS Credits: 6  

**Life 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 physico chemical 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:** BY4003
CE4002 - ENGINEERING MECHANICS
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To provide the student with a foundation in the theory and principles of statics and dynamics. Throughout the course emphasis is placed on the development of sound problem-solving techniques and logical interpretation of results. Application to realistic engineering problems is stressed through the use of examples, demonstrations, and assessment problems.

Syllabus: Load paths through structures under vertical gravity load; horizontal loads from wind / stability. Methods of providing lateral stability & shear walls, cores, frames, strut / x-bracing; Field trip to significant building / structure to investigate / sketch load paths in-situ; Structural form & funicular shapes applied to cables and arches; Bending moment and shear force diagrams under point and uniform loads, for simply supported and fixed end beams; Member forces in pin-jointed trusses; Introduction to structural dynamics / resonance; Introduction to relationship between bending moment / elastic modulus / bending stress; Design, develop and construct small structure to carry 150g load, including trial models and associated calculations to determine main member forces; Develop research methods and resources. Further experience of design as an iterative and creative process subject to constraints; Synthesis of ideas from strength of materials, 'Assembly and Techniques' and 'Drawing and Representation' in a design task; Assignments will typically involve prototype or model construction, as well as material or component testing; Presentation for critique of research results and proposals.

ECTS Credits: 3

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.


Prerequisites: EE4817

CE4024 - STRUCTURAL STEEL AND TIMBER DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

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:

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 & a review, section properties tables, design of fully restrained, partially 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 & a review, beam design, column design; axial and combined loading conditions, truss design and stability issues, Introduction to diaphragm & shearwall design, bolted, nailed and connected connections, glue laminated / I-beam design, structural detailing and fire & durability issues.

Prerequisites: CE4002

CE4025 - TRANSPORT PLANNING AND DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To provide the foundations for analysing stress and strain.


Prerequisites: CE4002
Civil Engineering and Materials Science

Rationale and Purpose of the Module: This module places transport in its wider historical and contemporary context as a major determinant of sustainable human settlement. It addresses current thinking and trends and introduces the main methods of data collection and analysis, transport system planning, appraisal, design and management.


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CE4028 - ENERGY EFFICIENT BUILDINGS: MODELLING AND DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

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 levels; 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 Overall 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 improvements.

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CE4034 - BUILDING ENERGY SYSTEMS
ECTS Credits: 3

Civil Engineering and Materials Science

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:


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CE4068 - PROCUREMENT AND CONTRACTING II
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: This module builds on the construction contracting and procurement topics provided in Procurement and Contracting I 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, programme in the management of disputes.

To develop a strong understanding of the standard forms that apply to the construction industry.

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.

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CE4206 - 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, paging, 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

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**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

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**CE4518 - 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.


**Prerequisites:** CE4701

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**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.

Practical methodologies: recognising patterns, problems. Management issues associated with industrial process of interpersonal communication skills in handling semantic errors.

Data gathering and critical thinking techniques and discretization using commercial Computational Fluid Dynamics (CFD) solvers; Turbulence modelling; Implementation of boundary conditions.

Characteristics of trouble shooting problems to the analysis and formulation of solutions to process problems. 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: CH4415, CH4405.

CH4002 - PHYSICAL CHEMISTRY 1
ECTS Credits: 6

Chemical & Environmental Science

Rationale and Purpose of the Module: i. To facilitate the student in understanding of 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 Arrhenius Equation; Accounting for the Rate Laws; Reaction Mechanisms; Steady State Approximation. Michaelis-Menten equation

Prerequisites: CH4003, CH4002

CH4008 - ORGANIC PHARMACEUTICAL CHEMISTRY 2
ECTS Credits: 6

Chemical & Environmental Science

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 ionic and radical mechanisms, alcohol formation by acid catalysed hydration and via hydroboration; Chemoselective control: Lindlar's catalyst and dissolving metal reduction; Hydride reducing reagents, Reformatsky reaction; use of protecting groups. Stereochemical control: asymmetric induction, diastereomeric selectivity, Felkin-Anh model; enantioselective catalysis, 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, Benzylene chemistry.

Prerequisites: CH4008

CH4012 - GENERAL CHEMISTRY 2
ECTS Credits: 6

Chemical & Environmental Science

Syllabus: Energetics: Enthalpy, entropy and free energy; first two laws of thermodynamics; thermochromy; equilibrium constants and free energy. Electrochemistry: Free energy and cell potential; emf cells and the Nerst 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.


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

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 Chatelier's Principle; Ions in aqueous solution; electrochemical cells, electrolytic conductivity, Reaction kinetics: zero, first and second order reactions and enzyme kinetics - Michaelis-Menten.

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 of SN1, SN2, E1, E2. Alcohol, 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
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 & amino acids, peptides and carbohydrates; to carry out practical work to support and reinforce some of the theoretical aspects encountered.

Prerequisites: CH4103, CH4102


Prerequisites: CH4103, CH4102

CH4152 - INTRODUCTORY ORGANIC CHEMISTRY 1B

ECTS Credits: 6

Chemical & Environmental Science

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.

Prerequisites: CH4101

ECTS Credits: 6

Chemical & Environmental Science

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

ECTS Credits: 6

Chemical & Environmental Science

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
determining the properties of substances, and to consider the bonding in molecules and in solids, particularly ionic solids.

**Syllabus:** Binding in simple covalent molecules: Lewis structures, molecular shape using VSEPR theory; polarity in molecules. Atomic and molecular orbitals; energy level diagrams and molecular orbitals diagrams for diatomic molecules. Bonding in transition metal complexes: crystal field theory and the colour, magnetism and thermodynamic properties of transition metal compounds. Bonding in solids: types of bonding and factors affecting the strength of bonding. Unit cells. Close-packing in metals. Close-packing in understanding ionic structures; radius ratio; lattice energy.

**Prerequisites:** CH4301

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**CH4304 - ANALYTICAL CHEMISTRY 2**  
ECTS Credits: 6

Chemical & Environmental Science

**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.

**Syllabus:** Introduction to separation science. Solvent extraction. Countercurrent extraction. Introduction to chromatography, modes of separation. Gas Chromatography. Liquid Chromatography. HPLC, Ion Chromatography, Size exclusion chromatography. Mass Spectrometry. Hypenated techniques, GC-MS HPLC-MS

**Prerequisites:** CH4303

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**CH4306 - ANALYTICAL CHEMISTRY 4**  
ECTS Credits: 6

Chemical & Environmental Science

**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 in-depth 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; Homotropic, enantiotropic and diastereotropic 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 1HNMR: 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

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**CH4308 - DISCRETE ANALYTICAL METHODS**  
ECTS Credits: 6

Chemical & Environmental Science

**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 (TCD, FID, ECD, FPD);  
- 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
**CH4354 - ANALYTICAL CHEMISTRY FOR THE ENVIRONMENT**  
*ECTS Credits: 6*

**Chemical & Environmental Science**

**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:** SYLLABUS  
SPECTORSOPHIC 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

**CH4404 - PROCESS TECHNOLOGY 1**  
*ECTS Credits: 6*

**Chemical & Environmental Science**

**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.*

**Syllabus:** Health and safety at work: types of factory environment and their physiological and psychological risks. Current legislation in the area of employer and employee liability. Codes of practice. The role of management and unions in safety.

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.

**CH4554 - ENVIRONMENTAL CHEMISTRY**  
*ECTS Credits: 6*

**Chemical & Environmental Science**

**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

**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

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.

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.

Prerequisites: CS4013

CS4014 - SOFTWARE DEVELOPMENT PROJECT
ECTS Credits: 6

Computer Science & Information Systems

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. Students complete the requirements and then take the course 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 to choose which 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 existing modelling, design and programming skills required to achieve the proposed system. During the remainder of the semester students will meet with their assigned tutor to discuss their work to date in a tutorial setting on a regular basis.

Prerequisites: CS4013

CS4026 - DIGITAL MEDIA SOFTWARE AND SYSTEMS 4
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To undertake a series of laboratory projects creating music composition systems.

Syllabus: 1. Survey of algorithmic and generative composition techniques
2. Real-time methods for sound and music generation
3. Implementation of random and stochastic systems, and iterative systems (e.g., fractal and chaos)
4. Live performance techniques
5. Aesthetics and critiques of contemporary musical examples

Prerequisites: CS4034, CS4063

CS4030 - DIGITAL ARTS 2
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module builds upon the curriculum of a range of modules especially Digital Arts 1. It deepens the engagement with this field by introducing the perceptual and aesthetic ramifications of the digital arts and situates the wide range of practices within cultural, psychological, political and economic models. It provides a foundation enabling students to situate, develop and specialise their digital arts practice as well as a context to which digital arts research can be related.
The elements of a game play: non-audience, limitations;

Syllabus: techniques to construct a model, design a digital game. On successful completion of the module the student will be able through use of appropriate tools and methodologies in order to develop a digital game model;

Rationale and Purpose of the Module:

Computer Science & Information Systems
ECTS Credits: 6

Prerequisites: CS4031

CS4056 - MOBILE APPLICATION DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to the design and development of interactive audio-visual artworks using low level coding.

Syllabus: This module will focus on the development of interactive audiovisual (a/v) artworks. Student will focus first on the analysis of existing a/v artworks. They will then create a concept, design and develop an interactive artwork using low level coding.

Key topics include:
1. Low level programming (C++ and openFrameworks)
2. Use of Integrated Development Environment (IDE) - XCode
3. Real-time manipulation of audio elements by means of code (C++)
4. Real-time manipulation of video elements by means of code (C++)
5. Communication protocols for interconnection with third-party software (MIDI, OSC)
6. User responsive art installations.

CS4059 - CREATIVE CODING
ECTS Credits: 6

Computer Science & Information Systems

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:
1. Overview of literature dealing with issues related to designing interaction (multidisciplinarity, variety of conceptual approaches, etc.).
2. Exploration and analysis of various approaches and interaction design as a discipline.
3. In depth discussion of notions of interactivity and interaction, and of the role of the interaction designer.
4. Discussion of notions of narrative and narrativity.
5. Analysis of different media and their interaction capabilities.
6. 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: CS4012, CS4512

CS4052 - FOUNDATIONS OF INTERACTION DESIGN
ECTS Credits: 6

Computer Science & Information Systems

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:

1. Overview of literature dealing with issues related to designing interaction (multidisciplinarity, variety of conceptual approaches, etc.).
2. Exploration and analysis of various approaches to interaction design as a discipline.
3. In depth discussion of notions of interactivity and interaction, and of the role of the interaction designer.
4. Discussion of notions of narrative and narrativity.
5. Analysis of different media and their interaction capabilities.
6. 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: CS4011

CS4034 - DIGITAL MEDIA SOFTWARE AND SYSTEMS 3
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To introduce students to the principles behind graphic-design & animation and the practice of creating graphics and animations.

Syllabus: 1. Bitmap Image Manipulation
2. Historical Development of Graphic Design
3. Vector Graphic Creation
4. Typography
5. Graphic Design
6. Page Layout
7. Colour Modes and Printing Artwork
8. Layer Based Compositions
9. Dynamics & Motion Graphics
10. Temporal Animation Techniques
11. Behavioural Animation Techniques
12. Rendering for Varied Output Media

CS4043 - GAMES MODELLING DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: The aim of the module is to provide students with knowledge to use an appropriate methodology in order to develop a digital game. On successful completion of the module the student will be able through use of appropriate tools and techniques to construct a model, design a digital game prototype and document it.

Syllabus: The game idea: starting points, intended audience, limitations; The elements of a game play: non-linearity, game mechanics, controls and inputs, output and feedback, modelling reality; game elements: characters, items, objects and their behaviour, functionality, mechanisms; Challenge, Fantasy, Fun, Depth and Focus; Gaming genres; Linear storytelling character versus non-linearity of the game play: places for storytelling, story scripting; The Game Development Life Cycle: Conceptual phase: base architecture, base game play and story lines, game mechanics and flow, conceptual game model; Detailed Game Design phase: game play, scenes and screens, game flow and progression, levels in different games (order, components, and goals), navigation, user interface, interactivity and immersion, game technology (hardware, software and limitations, tools and techniques to integrate props, media objects, special effects, storage and retrieval), platform and genre-specific design issues of 3D games; Development phase and playtesting, refining and aesthetics; Game Documenting phase: the Design Document and its elements;
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 technologies 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' programme of study.

Syllabus: - Categories and characteristics of web applications;
- Similarities and differences between the development of traditional, not web-based applications and the development of web applications;
- Modelling web applications: content, hypertext, presentation and customization modelling;
- Modelling methods such as OOWS model driven approach, OOHDM, UML, IDM approach, WebML, WebRATIO, HERA, WSDM, MDA;
- Web application architecture: categorizing architectures, layered architectures, data-aspect architectures;
- Web application design: information design and software design; presentation, interaction and functional design;
- Technologies for web applications: hypertext and hypermedia; client/server communication; client-side technologies; document-specific technologies; server-side technologies; current concepts, methods, techniques and tools;

- Security for web applications: encryption, digital signatures and certificates; secure client/server interaction; client security issues; service provider security issues;
- Semantic web: roles of software agents, semantic markup and ontologies; semantic web applications; semantic web services;

CS4072 - MEDIA PROGRAMMING 2
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module is intended to familiarise media students with computer programming. Students will learn how to write their own programs to manipulate images, sound files, movies and text.

Syllabus: - Vector and bitmapped image formats;
- Drawing simple shapes and drawing text on existing images;
- How we digitize/encode sounds; Nyquist theorem; manipulating samples;
- Using iteration and selection constructs to increase/decrease sound, normalizing sound;
- Creating sound clips, splicing sound, reversing and mirroring sound;
- Composing and blending sounds;
- Encoding, manipulating and creating movies;
- Reading from and writing to text files; string manipulation;

Prerequisites: CS4061

CS4076 - EVENT DRIVEN PROGRAMMING
ECTS Credits: 6

Computer Science & Information Systems

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

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

CS4078 - APPLIED INTERACTION DESIGN
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module will provide the student with knowledge of and practical experience in using techniques for the design of engaging interaction. Building on the design knowledge and technical skills the students have acquired at this stage of their course, applied interaction design problems will be presented to the students for analysis, reflection and intervention. Adaptation of Interaction Design methods will be discussed, and the particular perspective of Participatory Design will be examined in detail.

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.

Prerequisites: CS4061
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 Mark-Up Language (HTML); standard HTML document structure, HTML syntax, tags, text formatting, colours, images, hypertext links, absolute and relative referencing, list, tables, frames and forms. Considerations 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, 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.

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.

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 computations.

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/assertions 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.

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; - 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.

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.

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.

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 performance.

CS4212 - COMPUTER ORGANISATION 2
ECTS Credits: 6
Computer Science & Information Systems

Rationale and Purpose of the Module: The purpose of this module is to provide an elaboration on, and extension of, topics in computer hardware and software as introduced in Computer Organisation 1. To introduce the student to programming in low-level languages.

Syllabus: - Extend and elaborate topics in computer hardware and software from Computer Organisation 1; - A multilevel view of a modern computer; - The operation of the CPU fetch-execute cycle; - Organisation of memory: cache memory, main memory, registers, secondary memory; - Simplification of Boolean expressions using 2, 3 and 4
variable Karnaugh maps;
- Design of a CPU arithmetic-logic unit to implement a set of specified functions;
- Assembly language programming: the assembly process;
- Introduction to microarchitectures;

Prerequisites: CS4211

CS4358 - INTERACTIVE MULTIMEDIA
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: To understand the principles and techniques of Interactive Media. Content creation, processing and management. High-level authoring. Distribution methods. Intellectual Property Rights.

Syllabus: - Introduction to Digital Media: overview; communication theory; mediation.
- Cognitive Models: representation of aspects of mind; acquisition of knowledge.
- Interaction Design: linking media and support objects in temporal structures.
- Metaphors: describing concepts in accessible form; interface metaphors; domain metaphors.
- Image, Video and Sound Processing: introduction to high-end processing tools such as Adobe PhotoShop, Adobe Premiere, SoundForge, etc.; media asset management.
- Authoring: introduction to high-end authoring tools such as Macromedia Director, Authorware, Flash, etc.; synchronisation.
- Interfacing high-end authoring systems: extending the functionality of authoring systems through plugins; design of plugins.
- Distribution: CD, DVD, Web, DAB, DVB; quality and bandwidth considerations; compression; streaming.
- Intellectual Property Rights, Copyright.

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

Computer Science & Information Systems

Rationale and Purpose of the Module: The rationale for this module is that it is important for programmers and analysts to be aware of the issues and techniques involved in replacing, converting, modernising, and integrating legacy systems. The year 2000 (Y2K) problem made us uncomfortably aware of the existence and importance of legacy systems and it is now clear that the problem of legacy systems is one that will persist for as long as there are new developments in languages, technologies, or techniques.

Syllabus: Introduction to XML, DTDs, the XML Schema, Separation of content from presentational information in XML documents (e.g. CSS); The XML Document Object Model (XML DOM); Languages for automated transformations of text documents (e.g. XSLT); Introduction to Web Services and Service Oriented...
Architectures (SOA);
Legacy system characteristics;
Types of legacy system modernisation;
Reengineering of COBOL programs - Issues and Tools;
Approaches to Legacy System integration using object
wrappers or web services;
Web enabling Legacy Systems;
Data migration - issues and solutions;

Prerequisites: CS4556

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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

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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.

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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, hypertext, 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.

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CS4911 - INTRODUCTION TO INFORMATION
TECHNOLOGY
ECTS Credits: 6

Computer Science & Information Systems

Rationale and Purpose of the Module: This module is
designed to give 1st and 2nd year students from
disciplines other than Computing a historical and
theoretical introduction to information technology:
concepts, terminology and possible future developments;
together with practice in standard productivity software.

Syllabus: This module is designed to give 1st and 2nd
year students from disciplines other than Computing a
historical and theoretical introduction to information
technology: concepts, terminology and possible future
developments; together with practice in standard
productivity software.

- Concepts of information technology.
- Data and information.
- Software: general purpose applications, operating
systems features, programming development languages,
HTML; proprietary software and Open Source Software.
- Hardware: types of computers, input/output devices,
CPU, memory and secondary storage & disks and solid
state memory.
- Development of the PC.
- Communications and connectivity: modems,
communications channels, networks: LAN, WAN.
- The Internet and the Web: access, browsers, URLs,
search engines, multi-media.
- Security issues: virus, firewall, proxy server.
- Computers and society: dependence of society on computers, development of WP, e-commerce, the WWW impact on the media and advertising.
- Future hardware and software developments.
- Word Processing and spreadsheet practice.
- Data representation.
- HTML exercises.

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.

CU4014 - ANALYSING MEDIA DISCOURSE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

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 on a the æNew WorldÆ 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.

CU4014 - ANALYSING MEDIA DISCOURSE
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

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

CU4112 - 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 issues 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 indepth 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

Prerequisites: CU4111

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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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DM4028 - ENGINEERING SUSTAINABLE PRODUCTS
ECTS Credits: 6

Design and Manufacturing Technology

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 and 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.

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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 we collectively 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 and 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.
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

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

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

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

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

Guest Lecture John Rowe Financial Markets Division, Central Bank of Ireland
&bull; Monetary Policy Framework
&bull; National Central Bank's and the Liquidity Position of commercial banks.
&bull; Forecasting Liquidity Facilities.
&bull; Reaction of Central Bank's to the Financial Crisis.

7 European Monetary Union and the European Central Bank
&bull; The Political Benefits of EMU to Ireland
&bull; The Economic Benefits of EMU to Ireland
&bull; The Economic Costs of EMU
&bull; The European Central Bank
&bull; ECB Independence
&bull; How Interest Rates Are Set in the Euro Area
&bull; Monetary Policy in EMU
oThe Euro Area Inflation Record
oOne Monetary Policy Fits All?

8 A Dynamic Monetary Model of Aggregate Demand and Aggregate Supply
&bull; The Dynamic Model of Aggregate Demand and Aggregate Supply

EC4024 - FINANCIAL ECONOMICS
ECTS Credits: 6

Economics
Rationale and Purpose of the Module: Finance is the applied wing of economics. This course is about introducing students to the economics of finance via the study of several canonical models.

Syllabus: We will begin with data. First, we’ll describe the categories within which financially important variables exist, and develop ways to encapsulate them using simple statistics drawn from the study of simple probability distributions. We will develop graphical tools to analyse market movements in the lectures. Then we will move on to the study of financial history, to show the influence of uncertainty and ‘Black Swans’ on the markets, and to help you understand just how little we as economists really know about the markets and how they move. We will develop three simple but flawed models used to benchmark markets to round out the course, which every person interested in finance must know, as these models begin many of the conversations one might have about a stock or a bond. Then we will pull these models apart, so students will know more than most leaving a course like this at the undergraduate level.

Prerequisites: EC4101, EC4102, EC4004

EC4102 - 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 globalization, 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.

Topic 9. Money and Banking
What is money?, types of money, functions of money, creation of money, the role and functions of a Central Bank, control of money, the credit-fuelled property bubble and the crash.

Topic 10. Money and Interest Rates in a Closed Economy
The demand for money, money market equilibrium, nominal and real interest rates, aggregate demand and interest rates, monetary policy in a closed economy, crowding-out, government monetary financing.

Topic 11. The Balance of Payments and the Exchange Rate
Balance of payments, the significance of the current account balance, the foreign exchange market, the exchange rate of the Irish pound and the euro, the determinants of exchange rates, factors influencing exchange rates in the medium term, exchange rate regimes.

Topic 12. Inflation and Interest Rates in Open Economies
Purchasing power parity (PPP), PPP and the real exchange rate, harmonized competitiveness indicators, relative PPP, uncovered interest rate parity theory.

Topic 13. The Long-Run Performance of the Irish Economy
The growth of population, the standard of living, interpreting the record 1922-'61, the 1960s, the record since 1971, the property and construction bubble 2001-'07, the great recession and its aftermath.

Prerequisites: none

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

EC4112 - MACROECONOMICS (FOR NON-BUSINESS)
ECTS Credits: 6
Economics

Rationale and Purpose of the Module: The purpose of this module 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, behave and how the government and central bank can influence their behaviour. The first part of the course deals with key topics such as the theory of income determination, the consumption function and fiscal policy as well as the foreign exchange market. The latter part examines
monetary policy instrument including how interest rates are determined and how monetary policy is conducted by the European Central Bank. The benefits and costs of economic and monetary union are also addressed in this introductory macroeconomics module.

**Syllabus:**
1. GNP, business cycle, unemployment, inflation. Policy constraints;
3. The Consumption Function and Income Determination including disposable income, consumption and saving; Keynesian multiplier; average and marginal propensity to consume.
4. Fiscal Policy and the Business Cycle Stabilisation policy, fiscal policy in Ireland
5. Money and Banking Definitions; types of money; modern banking systems; money creation, money multiplier; instruments of monetary policy.
6. The Price Level and Money Supply and the quantity theory of money and implications
7. Interest Rate Determination. Monetary policy; demand for money; money market equilibrium, monetary policy and the Keynesian, Classical debate.
8. The Balance of Payments and Exchange Rate Theory. Foreign exchange market, flexible exchange rates, real exchange rates, trade-weighted exchange rate index, Central Bank intervention, external reserves, fixed exchange rates.
9. Purchasing power parity including absolute and relative PPP.
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

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**EC4418 - MONETARY ECONOMICS AND INTERNATIONAL 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 allocation, 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.
6. Economics of Regulation.

**Prerequisites:** EC4101, EC4102, EC4004

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**EC4711 - EU ECONOMIC ENVIRONMENT**

**ECTS Credits:** 6

**Economics**

**Rationale and Purpose of the Module:** To provide students with an understanding of the economic structures and policies operating at the level of the European Union, together with an analysis of the progress towards integration, its impact on member states and the rest of the world. The module provides a framework understanding of the EU, its institutions, and their competences in key areas of economic activity.

**Syllabus:**
The topics covered are set out as follows:
1. EU Competition Policy;
2. The EU Trade or Common Commercial Policy (CCP);
3. Monetary Integration and Economic and Monetary Union (EMU);
4. The Common Agricultural Policy (CAP);
5. The EU and Central and Eastern Europe (Enlargement);
6. The EU and the Less Developed Countries (LDCs).

**Prerequisites:** EC4034, EC4013

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**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.

**Syllabus:** Bus cycle timing: Read and Write cycles.
Synchronous and asynchronous bus cycles
The memory interface: Basic Memory device characteristics (ROM, EPROM, EEPROM, FLASH, FRAM, SRAM and DRAM). Static memory timing waveforms, address decoding (full and partial), the memory map. I/O interfacing: Memory mapped and isolated I/O, simple handshaking concepts. Software polling.
Serial Communication: Asynchronous and synchronous. RS-232, RS-485 and RS-422. SPI and I2C. USB
Typical peripheral interfaces: Parallel ports, serial, switches, LCDs, keypad interfaces and uses. I/O Ports. Timers, ADC and DAC converters.
Interrupts: Basic interrupt processing concepts. Interrupt hardware - priority encoders, daisy chaining, interrupt vectoring. Programmable interrupt controller.

**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.

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  
Gyroscopic Instruments, mechanical gyro, gimbaled gyro, strap-down gyro, Laser Gyros, Sagnac effect, Inertial Navigation Systems

Flight control systems

Aircraft use of radio; navigation, radar, voice and data communication

Radio wave propagation and radiation, propagation in the real atmosphere, ground effects: multipath and clutter, ground waves, sky and space waves.

Modulation, AM, FM, SSB, etc.

Radio antennas, unipole, dipole, loop antenna, capacitive antenna, microwave horn

Avionics radio systems across different frequency bands

Introduction to Principles and Use of Radar  
Primary and secondary radar systems

Antennas, mechanically steered radar beams, phased arrays.

Pulse radar, radar transmitters and receivers, radar displays, moving target indicator. Doppler radar, CW and frequency modulated radar.

Radar range equation, input noise, signal-to-noise ratio.

Radar cross section of target aircraft  
2D and 3D radar systems

Radar resolution, in range, azimuth and elevation.

Navigation Theory and Systems

Navigation aids for aircraft

Radio Navigation and Telecommunications Systems

Instrument Landing Systems

Microwave Landing Systems

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

Navigation sub systems surveillance radar for Air Traffic Control.

Digital Data Busses used on Aircraft  
MIL STD 1553, ARINC 429, A629

**Prerequisites:** EE4001, EE4004

**EE4012 - CIRCUIT ANALYSIS 1**  
ECTS Credits: 6  
Electronic & Computer Engineering

**EE4013 - COMPUTER NETWORKS**  
ECTS Credits: 6  
Electronic & Computer Engineering

**EE4014 - ELECTRICAL ENERGY**  
ECTS Credits: 6  
Electronic & Computer Engineering

**EE4018 - ENGINEERING MANAGEMENT**  
ECTS Credits: 6  
Electronic & Computer Engineering

**Rationale and Purpose of the Module:**  
Comprehensive overview of the workings of a technology-based business, and the chemistry of techniques available for the prudent management of such a business in an increasingly competitive environment.

**Syllabus:**  
The firm and its environment.  
Introduction to economic, managerial, behavioural and social responsibility theories of organisational objectives. Present market trends and business in the 21st Century. General external analysis (national, international and global) STEP

Industry analysis (5 forces, OT). Internal analysis (SW)


Management: Planning (PERT), Controlling (Loops), Motivation (Expectancy and other theories), Organising, Coordinating. Job Design, Decision Making, Leadership Theories, Team working and development.

Overview of essential practical skills.
EE4023 - DISTRIBUTED SYSTEMS
ECTS Credits: 6

Electronic & Computer Engineering

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

Electronic & Computer Engineering

Review of electromagnetism, Faradays, Amperes and Lezs laws, MMF, flux, flux density, magnetic field intensity and reluctance, self and mutual inductance, magnetic materials, BH curves, core losses. Magnetic circuits, electric circuit analogies, analysis of simple magnetic circuits. Transformers: Construction and principles, ideal transformer, voltage and current transformers, power transformers, single/3 phase, equivalent circuits, open and short circuit tests, application in power systems, per unit system. Machines - DC motors and generators: construction and principles, separately excited, series, shunt and compound machines. Voltage and torque equations. Equivalent circuits, Power flow. Machine characteristics: open circuit/magnetization, speed, torque and dynamic characteristics. Which configuration for which application. DC machines in modern power generation and motion control. AC machines, rotating magnetic fields, alternators, 3 phase generators, salient pole/cylindrical rotor, derivation of equivalent circuit from open circuit and short circuit tests, synchronous reactance, the phasor diagram (of cylindrical rotor machine) and the Power Angle Curve. Synchronising to an infinite busbar. Steady state stability limit. Induction machines (motors and generators) single phase, 3 phase. Derivation of equivalent circuit, determination of torque speed characteristic. Locked-rotor and no-load tests. Induction generator. Introduction to V/F control. Starting methods and protection. Electrical machines developments for renewable energy generation. AC power real and reactive power calculations. Power factor correction, balanced 3 phase systems analysis, star and delta connected loads, advantages of 3 phase systems, the per unit system.

EE4028 - TELECOMMUNICATION NETWORK ARCHITECTURES 2
ECTS Credits: 6

Electronic & Computer Engineering

EE4034 - TELECOMMUNICATIONS FUNDAMENTALS
ECTS Credits: 6

Electronic & Computer Engineering

EE4044 - COMMUNICATIONS AND NETWORKS PROTOCOLS
ECTS Credits: 6

Electronic & Computer Engineering

EE4102 - ELECTRICAL SCIENCE 2
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: To develop a good understanding of ac circuit descriptions using vectors (and phasors) with numerous examples, using a simplified approach


Circulating current in parallel tuned circuit. COUPLED CIRCUITS: Inductively coupled coils, induced e.m.f., mutual inductance, coupling coefficient. Reflected impedance for loaded coupled circuit for k < 1. Input and output equivalent circuits. Properties of ideal voltage and current transformers. The auto transformer.

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).

Syllabus: Review of vector calculus. Electrostatics - Electric field, calculation of the electric field, electric potential, conductors and dielectrics, electrostatic field boundary conditions, capacitance, Poisson/Es and Laplace/Es equations. Current density. Resistance calculations. Magnetostatics - Magnetic flux density, vector magnetic potential. Biot-Savart law, magnetic field intensity, magnetic circuits, magnetic materials, inductance. Time-varying fields - Faraday/Es law, Maxwell/Es equations, time harmonic electromagnetics, plane electromagnetic waves in lossfree and lossy media, low-loss dielectrics and conductors, power propagation and the Poynting vector, instantaneous and average power densities. 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. Introduction to instrumentation. Sensor characteristics. Signal conditioning. Review of typical sensors.

**Prerequisites:** MA4001, MA4002, MA4003

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**EE4216 - CONTROL 2**

ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module extends fundamental Control principles with much more emphasis placed on the application of linear analytical techniques to 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, Nyquist, Routh-Hurwitz, and Root Locus methods. Design techniques for system compensation 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.

PROCESS CONTROL: Terminology and practice, application and use of three term control, PID design in the frequency domain, integral wind-up and similar problems, Benchmark methods for tuning PID controllers, (Ziegler-Nichols, Haalman etc.).

**Prerequisites:** EE4214

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**EE4314 - ACTIVE CIRCUIT DESIGN 2**

ECTS Credits: 6

**Electronic & Computer Engineering**

**Rationale and Purpose of the Module:** This module introduces the basic properties of operational amplifiers feedback, and their use in both linear and non-linear applications as well as the introduction of AC low frequency design. An introduction to Analogue signal conversion is also given.

**Syllabus:** THE DIFFERENTIAL AMPLIFIER AS A TWO ENDED INPUT AMPLIFIER. Introduce the diff amp as the input element to Op Amps. Define the terms Differential Gain, Common Mode Gain and Common Mode Rejection Ratio OP-AMP CHARACTERISTICS: Simplified internal view of a typical 3-stage op-amp, current limiting, open-loop transfer curve, offset error. Op-amp configurations; current in, voltage out etc. Finite gain errors. Slew limitations.

**Prerequisites:** EE4316

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**EE4328 - POWER ELECTRONICS**

ECTS Credits: 6

**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
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 . products 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 (Simplis)

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)

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**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 1) 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.

**Syllabus:** Basic electrical properties of MOS and CMOS circuits. Drain-to-source current Ids versus voltage Vds relationships. The threshold voltage Vt. MOS Transistor Circuit Model. MOS transistor transconductance gm and output conductance gds. Future trends.

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.


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**EE4522 - DIGITAL SYSTEMS 1**

ECTS Credits: 6

Electronic & Computer Engineering

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


BASEBAND DIGITAL COMMUNICATIONS: Line codes and their spectral attributes. Detection of digital signals...


FUNDAMENTALS OF INFORMATION THEORY and the limits to information transmission: information source encoding theory and techniques, with examples in fax, voice and video compression. Communication channels: m-ary discrete memoryless channels, binary symmetric channels, equivocation, mutual information, and channel capacity. Shannon-Hartley theorem and the possibilities and limits to error free transmission. CHANNEL CODING: error-detecting and error-correcting coding theory and techniques for random and burst error protection on communication channels. Interleaving principles. Types and sources of error: Linear block coding, including LSBC, generator and PCM matrices, Standard Array and syndrome decoding; statistical decision theory and minimum distance-, maximum likelihood- and maximum a-posteriori- decoding theory and techniques; Perfect codes, Hamming codes, shortened Hamming codes and other examples. Cyclic codes and Convolution codes: theory and examples. Soft decision and hard decision detection. Viterbi decoding algorithm for convolution codes.

**Prerequisites:** EE4044

**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, such that students will develop a sound knowledge and understanding of linear transform theory for signal processing, and to apply it to correlation and filtering of signals, in analogue and digital domains.


**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.

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

**Syllabus:** This module introduces students to theatre-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.

**School of Culture and Communication**

**EE4006 - CRITICAL PRACTICE 2 - RENAISSANCE LITERATURE**

ECTS Credits: 6

**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.

**School of Culture and Communication**

**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.

**Rationale and Purpose of the Module:** This module covers British literature from 1945-present. Writers will include major novelists of the period such as Jean Rhys, Doris Lessing, Margaret Drabble, A. S. Byatt, Salman Rushdie, Jeanette Winterson, Kazuo Ishiguro and Zadie Smith; poets such as Philip Larkin, Dylan Thomas, Derek Walcott, Geoffrey Hill and ted Hughes; and playwrights such as John Osborne, Joe Orton, Harold Pinter, Tom Stoppard, Caryl Churchill and Sarah Kane. To define the themes and interpret this literature, students will become familiar with political, social and historical contexts (the Second World War, various liberation movements, the rise and fall of the welfare state), with significant concepts and
philosophies (Thatcherism, postmodernism), and with literary movements (Angry Young Men, Kitchen Sink Realism, New Brutalists)

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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-c1700) 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/Es 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, 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 Wards, 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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EH4018 - CONTEMPORARY IRISH LITERATURE
ECTS Credits: 6

School of Culture and Communication

Rationale and Purpose of the Module: This module aims to introduce students to a range of Irish narrative texts written in English since 1980 and in doing so: Explore the engagement of these texts with contemporary historical, social and political contexts. Consider the contemporary writing of cultural and social identities in, and about, Ireland. Evaluate literary responses to the Northern Troubles and consider the ways in which literary/cultural constructions of Northern Ireland are reproduced at home and abroad. Examine the representation of community and political activism in Irish writing.

Address the construction of gender and sexuality in contemporary Irish writing.

Explore the writing of the Irish diaspora as well as that of its immigrant communities. Evaluate a range of theoretical approaches which have been, or might be, applied to this literature.

Syllabus: The period since 1980 has seen profound changes throughout the island of Ireland, particularly in the post-Robinson period. Drawing on the work of writers north and south, as well as those working within both the diaspora and immigrant communities in Ireland, students will consider how these texts have constructed and deconstructed the cultural, social and political landscape of contemporary Ireland.

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

School of Culture and Communication

Rationale and Purpose of the Module: On successful completion of this module, students will be able to apply a critical and cogent awareness of Colonial and postcolonial histories of the 19th and 20th centuries. Multiple socio-political and cultural contexts associated with Anglophone world literature. Key literary texts in the field of postcolonial studies from around the world. A sample of key theoretical debates in the field of postcolonial studies at large (connected to additional theoretical fields such as feminism, ecocriticism, postmodernism, and so on). Ways to compare, contrast and combine different theoretical and methodological positions in the field of postcolonial studies.

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/ hybridity, secular modernity/ religious conservatism, nation/nativism - and 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.
**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 innovations 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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**EH4036 - IRISH LITERATURE 1930 - 1990**  
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 race, ethnicity and gender in literature; questions of 'gender trouble' and sexuality; and postmodern feminist perspectives as they apply to literary texts. Through this 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.

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

**Education & Professional Studies**

**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.

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**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 reading 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 race, ethnicity and gender in literature; questions of 'gender trouble' and sexuality; and postmodern feminist perspectives as they apply to literary texts. Through this 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.

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**EN4016 - RESPONDING TO DIVERSITY IN EDUCATION**  
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.
Education & Professional Studies

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)

Syllabus:

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

Education & Professional Studies

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:

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

Education & Professional Studies

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:

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 fashioning innovative entrepreneurship. In addition the module examines the process of managing innovation.

Syllabus:

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.
ER4404 - MANAGING THE ENVIRONMENT
ECTS Credits: 6
Chemical & Environmental Science

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.


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

ER4408 - ENVIRONMENTAL MANAGEMENT 2
ECTS Credits: 6
Chemical & Environmental Science

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.

ER4508 - POLLUTION CONTROL 2 (WASTE MANAGEMENT)
ECTS Credits: 6
Chemical & Environmental Science

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 & Environmental Science

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); subnetworking and super networking; 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; e-mail 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.

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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.

ET4014 - 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.

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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.


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 telecommunications 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.
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.


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 ôAnalogue Electronics 1ö. 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

ET4142 - COMPUTER SYSTEMS ARCHITECTURE
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.
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
ProgrammerÈEs 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 aMy ComputerÆ and other PC-based tools

Prerequisites: ET4151

ET4224 - ROBOTICS 1: SENSORS AND ACTUATORS
ECTS Credits: 6

Electronic & Computer Engineering

Rationale and Purpose of the Module: This module introduces students to fundamental principles of

* 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.

Syllabus: Introduction to Physical Phenomenon:--
* SI Units.
* Principles of sensor operation (mechanical, thermal, sound, light).

Sensors and Transducers:--
* Concept of transducer action as signal conversion with particular emphasis on an electrical signal as the output.
* The ideal transducer.
* Resolution, accuracy, linearity definitions and relevance.
* Review of some physical phenomena that result in electrical parameter variations

Actuators
* Magneto Motive Force & magnetic circuits,
* Motors: DC machines with permanent magnet and field windings, Induction motors, Stepper Motors, Stepper drives.
* Motor Drive Circuits.

Sensor Interfacing Circuitry introduction/review
* Review of Op-Amp as applied to sensing systems, Instrumentation amplifiers, diff amps, etc. Simple DACs, ADCs successive approximation and integrating, operating principles and suitability for industrial applications. 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

ET4243 - WEB AND DATABASE TECHNOLOGY 2
ECTS Credits: 6

Electronic & Computer Engineering

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

Syllabus: Operating System: Definitions, types of operating systems.

Processes: Concurrency, states, queues, scheduling, threads.

Interprocess communication and synchronisation: Mutual exclusion, race conditions, busy-waiting solutions, TSLs, semaphores, monitors, simple message passing, classical problems.

Deadlock: Conditions for deadlock and solutions.

Memory Management: Swapping, virtual memory, paging and segmentation.

File systems to support multi-tasking: Disk organisation, space management, file sharing, file protection, performance issues.


Laboratory: The students will become familiar with one operating system: UNIX or Microsoft Windows. Exercises will involve: shell scripting, system calls using C/C++, solving synchronisation problems in a concurrent programming environment...

Prerequisites: ET4253, ET4263

ET4725 - OPERATING SYSTEMS 1

ECTS Credits: 6

Electronic & Computer Engineering

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

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**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 reviewing 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:** FR4147

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

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:**  
(i) To provide students with an introduction to major aspects of contemporary Francophone societies and cultures;  
(ii) to familiarise students to issues related to the evolution of the French language particularly its regional varieties and la Francophonie worldwide;  
(iii) to promote students reading and analytical skills in the study of French literature;  
(iv) to give a solid grounding to a number of points of French Grammar.  
(v) to further develop students practical language skills (oral and written).

**Syllabus:** Students are introduced in lectures to the study of social, historical, linguistic and literary aspects of France and francophone societies. Themes explored 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. These topics are discussed in depth in the more active setting of weekly tutorials. Oral and aural skills in French are a particular focus, and they are developed through the discussion of a broad selection of oral and written 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.

**Prerequisites:** 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.
material from diverse media. The study of French grammar in semester 1 is continued.

Prerequisites: FR4241

FR4246 - FRENCH LANGUAGE CULTURE AND SOCIETY 4
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: This module aims to:
- 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 practise translation from and into French 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 critically evaluate their functions; (ii) to enable students to improve written and oral language skills; (iii) to provide an understanding of the principles of bilateral interpreting and introductory practice; (iv) to give students practice in translating a variety of texts and to familiarise them with the appropriate translation strategies.

Syllabus: (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

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.

FR4626 - FRENCH LITERATURE AND CULTURE 4
19TH CENTURY ART
ECTS Credits: 6
School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide students with the means to recognise and evaluate the links between art and society in 19th century France. This is achieved by:
- giving an overview of the political, economic and cultural development of France from the revolution to circa 1880
- studying selected poems from mid-century onwards
- analysing French painting, particularly the realist/impressionist tradition
- reading and studying a selected realist/naturalist novel

Syllabus: The module is structured around a lecture and tutorials. The lecture will cover aspects of the development of France as well as introducing students to the study and appreciation of painting in the period. The tutorials will concentrate on textual analysis of the poetry and the novels.

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 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).

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 - in semester 1- is continued.

Prerequisites: FR4921

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.

Prerequisites: FR4927

FT4204 - FOOD CHEMISTRY
ECTS Credits: 6
Life 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


FT4214 - PUBLIC HEALTH NUTRITION
ECTS Credits: 6
Life 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, heart disease, nutritional deficiencies, osteoporosis, cancer and immunity will be discussed. Nutritional controversies and attitudes surrounding food choice and preference will also be explored and their role in effecting dietary change.

The purpose of this module is to:

- To provide an overview of the role of nutrition as a major factor in the aetiology of chronic disease of relevance to public health.
- To examine the role of diet in treatment and prevention of a range of chronic disease.
- To explore a number of emerging diet-related public health issues.

To introduce the principals and correct format of scientific writing, and to enhance critical ability in identifying and reviewing relevant scientific research, this module will include project work and literature review based on specific areas related to public health. Students will be expected to prepare a detailed report on their research work and to present their findings.

**Syllabus:**
1. Overview of nutritional assessment design and techniques used for population-based research and research findings.
2. Examine the role of diet in selected chronic disease of public health concern including obesity, heart disease, nutritional deficiencies, osteoporosis, cancer and immunity.
3. Discuss nutritional controversies and evaluate the associated evidence base.
4. Role of media / regulatory bodies / food industry / society / culture on food choice
5. Other factors (environmental, psychological) influencing consumer food choice and attitudes surrounding preference will also be explored.

**Prerequisites:** BY4214

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

**Life 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**
**ECTS Credits: 3**

**Life 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**

**Life 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**

**Life 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 (QTL/Es) Related issues; Regulations and Legal declarations, Ethics, Consumer concerns, biotechnology and the
environment, Future trends

Prerequisites: BC4904, BC4803

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

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 herself 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 adn 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, ball choirp 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, Graunuale.

Prerequisites: GA4115

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 project subject, 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.

GE4142 - 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. To introduce aspects of social and regional variation in the German language. To continue introduction to the analysis of literary texts in German. To conclude the revision of grammatical structures enabling students to use them 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. 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

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

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To enhance students’ knowledge about present day Germany by exploring the historical background of cultural life in Germany today. To further develop writing skills and reading comprehension at advanced level. To further develop students’ skills in the analysis of more complex literary texts in German. To consolidate grammatical structures at an appropriate level.
**Prerequisites:** GE4147

**GE4148 - GERMAN LANGUAGE AND SOCIETY 6: ISSUES AND DEBATES**  
**ECTS Credits:** 6  

**School of Modern Languages and Applied Linguistics**

**Rationale and Purpose of the Module:** To explore current issues of particular relevance in the German-speaking countries today with a particular focus on literary/cultural controversies.  

**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: a) discussions of literary texts, newspaper, magazine articles and TV programmes on topical issues focusing on the characteristics of different text types and language registers; b) issues in Austria and Switzerland including presentations in the foreign language; c) translation class English/German with a particular focus on the problem of registers.

**Prerequisites:** GE4147

**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.

**Prerequisites:** GE4211

**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.

**Prerequisites:** GE4248

**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.

Tutorial work: Oral presentation & discussion class: drawing on text and a reading; intertextuality; reception of literature; social and political developments.

GE4622 - 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: Focus on job application process in Germany-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

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”.

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

Prerequisites: GE4921

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 Germany-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.

Prerequisites: GE4924, GE4143

GE4922 - GERMAN FOR BUSINESS 2A
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/E and aSturm und Drang/E; 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 aWilhelminische Zeit prior to World War I.

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/E and aSturm und Drang/E; 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 aWilhelminische Zeit prior to World War I.

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 work and their time with a particular focus on dramatic texts.
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

HI4068 - 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

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: EuropeÆs æzero hourÆ? re-establishing order; EuropeÆs political divisions; recovery, growth, and limits: the European economy; seducing Europeans: mobility, consumerism, and culture; the aessecond sexÆ; 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 EuropeÆE

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 compliment 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 via mercenaries 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 Fronde - 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.

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**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 Nullus" 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.

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**IE4214 - INDUSTRIAL ORGANISATION**  
**ECTS Credits:** 6

**Design and Manufacturing Technology**

**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's 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 reorderings, 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

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**IE4238 - OPERATIONS ANALYSIS AM**  
**ECTS Credits:** 6

**Design and Manufacturing Technology**

**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.

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**IE4248 - PROJECT PLANNING AND CONTROL**  
**ECTS Credits:** 6

**Design and Manufacturing Technology**

**Rationale and Purpose of the Module:** To develop students abilities to plan and manage large engineering projects, and to develop skills required to effectively
Communicate with other company departments directly involved in such projects, namely: Finance, Manufacturing and Corporate Management.

**Syllabus:** What is a project: the 3 goals of a project. Project selection methods, project appraisal criteria, economic analysis, Project life-cycles

The project managers role and responsibilities, leadership, professional project management, projects within organisations, the project team, motivation, teamwork, communications on projects.

Project planning: Project Charter and scope, work breakdown structures (WBS), linear responsibility chart (LRC), multidisciplinary teams, concurrent engineering, interface management, Design Structure Matrix.

Project Budgeting: Cost estimation for projects: Estimating resource, time and cost requirements and constraints; Life-cycle costs, detailed & parametric cost estimating models, Budget determination.

Project management software, MS Project applications and examples.

Project Scheduling: PERT and CPM networks, finding the critical path and critical time, milestone management, calculating slack, project uncertainty and risk management, probabilistic activity times, simulation, the Gantt Chart, additional diagramming methods.

Project Resources: Expediting a project, crashing a project, resource loading and levelling managing scarce resources on one or several projects, multiple projects, Critical Chain project management.

Project Control: Plan-Monitor-Control Cycle, Project reporting, Earned Value, Project control systems, Scope creep and project change control.

Evaluating projects: Evaluation criteria, project auditing, project termination

**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

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**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

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**IN4014 - LIFE INSURANCE**

ECTS Credits: 6

**Accounting & Finance**

**Rationale and Purpose of the Module:** The module provided the student with an understanding of the principles of life insurance and the history and importance of life insurance in both the Irish market and on a global level.

**Syllabus:** The module includes an analysis of term insurance, whole of life insurance and endowment insurance. The health insurance market in Ireland is studied, as is the Irish social insurance system with specific focus on the retirement and pensions market. 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

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**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
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 listening comprehension, speaking, reading and writing; to continue the study 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.

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**Prerequisites:** JA4211
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 listening comprehension, speaking, reading and writing; to continue the study 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 related 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 Oscarî: 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.

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 standfirsts. 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
### Rationale and Purpose of the Module:
The module is designed 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 and investigated. Seminars 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.

* Students will write a brief synopsis of each of the seminars and will also choose to study one of the media contexts presented in the seminar series in depth in an extended essay.

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### 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.

### Syllabus:

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### 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; corporate integrity; minimum requirements, distributions out of profits, repayments of capital; corporate termination: liquidation, receivership, winding up, examinership, amalgamations and reconstitutions. 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.


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.

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 dispute; maintenance, separation agreements; judicial separation; divorce; preliminary and ancillary relief in judicial separation and divorce proceedings; and the non-marital family.

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.

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 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.

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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 client interviewing. The syllabus will focus extensively on self-directed learning and active exercises. In addition, students will be expected to explore the role of ethics and professional responsibility in the legal system, paying particular attention to comparative approaches.

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**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.

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**LA4082 - LAW OF EVIDENCE**
ECTS Credits: 6

**Law**

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**LA4122 - CONTRACT LAW 2**
ECTS Credits: 6

**Law**

**Rationale and Purpose of the Module:** To examine the grounds upon which contracts may be discharged or avoided and the remedies available to ensure performance of contractual obligations.


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**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 two modules called Law of Business Associations 1 and 2. The law name 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.

**LI4212 - LINGUISTICS 2**  
**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 sociolinguistics. The various subfields and branches of sociolinguistics will be introduced and discussed in class lectures.

The more specific objectives of this course are:  
Recognize the fundamental relationship between language and society.
Use the basic terminology and concepts of sociolinguistic subfields
To acquaint you with the basic concepts necessary to pursue sociolinguistic studies further, if you wish to.

**Syllabus:** The module comprises four distinct but also interrelated themes, each of which will be dealt with in sequential blocks over the twelve week module:
1. Sociolinguistics: In this first part, students will be introduced to basic concepts in sociolinguistics, including: accent, dialect, speech community.
2. Multilingualism: In this second part, students will learn about key features of multilingual societies.
3. Language and Media. In the third section, students will focus on the relationship between language and how it is used in the media.
4. Language and Gender: The final section of the module will focus on the relationship between language and gender.

**Prerequisites:** LI4211

**ECTS Credits:** 6

**MA4002 - ENGINEERING MATHEMATICS 2**

**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. Matrix representation of and solution of systems of linear equations. Matrix algebra, invertibility, determinants.

**Prerequisites:** MA4001

**ECTS Credits:** 6

**MA4004 - ENGINEERING MATHEMATICS 4**

**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.


**Prerequisites:** MA4003

**ECTS Credits:** 6

**MA4014 - SCIENCE AND ENGINEERING MATHEMATICS**

**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.

**ECTS Credits:** 6

**MA4006 - ENGINEERING MATHEMATICS 5**

**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'). Partial Differential Equations: Modelling and derivation of wave, heat and Laplace's equation. Solution of such equations by separation of variables. Numerical methods for the solution of partial differential equations using finite differences.

**Prerequisites:** MA4003

**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.


Mathematics of finance: compound interest, geometric progressions, frequent value, sinking funds, annuities. Matrices and determinants (2x2) and (3x3) matrices: examples, definitions, matrix operations, (2x2) and (3x3) determinants, matrix, inversion, representing and solving linear systems, Cramer’s rule. Linear programming: determination, comparing two means, comparing two proportions, the chi-squared test of independence, Simpson’s Paradox, simple linear regression, correlation, residuals.

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’s Paradox, simple linear regression, correlation, residuals.

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

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 accompanied 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.
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

MA4701 - TECHNOLOGICAL MATHEMATICS 1
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 probabilities

Prerequisites: MA4701

MA4702 - TECHNOLOGICAL 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 mathematical skills relevant to technology.

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: definite 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.

Syllabus: [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

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 an development of techniques statistical process control charts: capability: Cpk, Cpk, R&R studies control charts (Shewhart), variable and attribute, control & out of control, specifications, short and long run applications, proportion defective, ARL, PPM cusums, 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

Mathematics & Statistics

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

Mathematics & Statistics

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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MD4018 - 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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MD4024 - IRISH TRADITIONAL MUSIC AND DANCE STUDIES 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.

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MD4026 - IRISH TRADITIONAL MUSIC AND DANCE STUDIES 3
ECTS Credits: 6

Humanities

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. The study will be primarily focussed on the Irish traditions, 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.

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ethnicty, globalisation and the meaning of tradition.

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**MD4028 - IRISH TRADITIONAL MUSIC AND DANCE STUDIES 5**  
*ECTS Credits: 6*

**Humanities**

**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 research project could have a performance orientation.

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**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 second level teaching contexts but will also introduce students to crucial musico-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 classical, neo-traditions will also be explored, referencing dance traditions.

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**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.

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**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.

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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).

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**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.

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**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.
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; ceilidh 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.

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.

MD4127 - MOVEMENTS AND SOUNDS OF NORTH AMERICAN PERCUSSIVE DANCE AND MUSIC TRADITIONS
ECTS Credits: 6

Humanities

ME4008 - ORTHOPAEDIC BIOMECHANICS AND MECHANOBIOLGY
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical 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;

ME4112 - ENGINEERING MECHANICS 2
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: The overall objective of the course is to enable students to apply Newtons Laws of Motion (in particular the second law) to objects in motion with non-zero acceleration. The course thus goes beyond the topic of statics, which was examined in Engineering Mechanics 1 (ME4111), and analyses the kinematics of bodies in motion, the rules used to describe the motion of bodies in space, and the kinetics, which relates the motion of bodies to the forces which give rise to the motion. The study of accelerating bodies is often referred to as Dynamics, as opposed to the study of bodies in equilibrium, which is referred to as Statics.

Syllabus: Application of Newtons Laws to particles and rigid bodies not in equilibrium (Dynamics) Kinematics of particles, rectilinear and curvilinear motion, Cartesian, polar, normal and tangential co-ordinates; relative motion. Kinetics of particles, work, kinetic energy and potential energy, impulse and momentum. Collections of particles, moment of inertia. Kinematics of rigid bodies in plane motion, rolling wheels, mechanisms. Kinetics of rigid bodies in plane motion, translation of rigid bodies, rotation about a fixed point and general plane motion

Prerequisites: ME4111

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

Humanities

Rationale and Purpose of the Module: To develop the students 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 musicological 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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MD4052 - NATIVE MUSIC AND DANCE TRADITIONS OF IRELAND
ECTS Credits: 6

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.

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ME4101 - AIRCRAFT MECHANISMS
ECTS Credits: 3

Mechanical, Aeronautical and Biomedical 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
Fatigue. Unsymmetrical bending. Buckling of struts (Euler and Rankine, Tresca and Von Mises). Deflection of beams. Criteria of failure for isotropic homogeneous materials (Rankine, Tresca and Von Mises). LEFM. To analyse the stresses and deformation in circular plates and analyse and measure the state of strain at a point in a 2D strain field.  

Prerequisites: ME4111, ME4112

**ME4226 - MECHANICS OF SOLIDS 2**
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To understand and analyse 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.  

**Prerequisites:** ME4213

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**ME4306 - BIOCOMPATIBILITY**
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To provide an appreciation of the Cellular-Material Interactions that occur when a Material is used for different Biomedical Applications. Discussion of Pathological Changes and Approaches to repair. Classification of medical device interactions and methods of assessment. Relevance of testing to medical device design strategy, regulation, validation and post market surveillance. Evolution of the regulatory environment and its implications.  

**Prerequisites:** ME4416

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**ME4308 - BIOMATERIALS 2**
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical 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. Materials for hard tissue orthopaedic materials, 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
Mechanical, Aeronautical and Biomedical 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. Aircraft maintenance: philosophy of maintenance, inspection schedules, EASA regulatory requirements, condition monitoring, original equipment manufacturer/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 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 - THERMODYNAMICS 2
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical 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, reheat 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 for single stage and multi-stage compressors.


Prerequisites: ME4523

ME4526 - INTRODUCTION TO HEAT TRANSFER
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical 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

Syllabus: Fourier’s Law of Heat Conduction
The Convection Equation
Thermal Resistance’s and their Application

Two-dimensional Heat Conduction: An Analytical Example
Numerical Methods in Heat Conduction
Time Varying Heat Transfer: The Lump Capacity Method
Forced Convection: Standard Heat Transfer Correlation’s and their Application
Free Convection: Standard Heat Transfer Correlation’s and their Applications
Thermal Radiation: An Introduction
Heat Exchange Design Equations: The Log Mean Temperature Difference

Prerequisites: ME4412

ME4528 - PROPULSION SYSTEMS
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical 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.

Syllabus: 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.

Prerequisites: ME4412

ME4616 - FINITE ELEMENT ANALYSIS
ECTS Credits: 6

Mechanical, Aeronautical and Biomedical Engineering

Rationale and Purpose of the Module: To advance the knowledge of the students of fluid flow, aerodynamics and convective heat transfer.


Prerequisites: ME4412
**ME4718 - FLUID PROCESS CONTROL**

**ECTS Credits:** 6

**Mechanical, Aeronautical and Biomedical Engineering**

**Rationale and Purpose of the Module:** To provide the student with a very good knowledge of advanced process control with emphasis on fluid & thermal processes.

**Syllabus:**
- Advanced Control Strategies
- Control of Multi-Input-Multi-Output (MIMO) Processes
- Development of Discrete-time Models
- Dynamic Response of Discrete-Time systems
- Analysis of Sampled-Data systems
- Design of Digital Controllers

**Prerequisites:** ME4412

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**ME4736 - PHYSIOLOGICAL FLUID MECHANICS 1**

**ECTS Credits:** 6

**Mechanical, Aeronautical and Biomedical 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.

**Rationale and Purpose of the Module:**

**ME4746 - PHYSIOLOGICAL FLUID MECHANICS 2**

**ECTS Credits:** 6

**Mechanical, Aeronautical and Biomedical 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.

**Syllabus:**
- 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 transport systems: cardiovascular system, respiratory system, gastrointestinal tract, liver and kidneys. Extension of fluid mechanics of capillary flow into oscillating flow. Introduction to mass transport, derivation of the relevant conservation equations, dimensional analysis and scaling. Estimating mass transfer coefficients using correlations. Ficks law of diffusion (dilute solutions), the Stokes-Einstein equation and estimation of frictional drag coefficients. Osmosis and mass transport through membranes. Introduction to thermal transport, conduction, convection and radiation and derivation of the conservation equations. Estimation of heat transfer coefficients. Thermal regulation of biological systems

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**ME4818 - MECHANICAL DESIGN**

**ECTS Credits:** 6

**Mechanical, Aeronautical and Biomedical Engineering**

**Rationale and Purpose of the Module:** To expose the student to the practical application of design, materials, mechanics and strength of materials theory. The work will focus on the appropriate use of Standards, Charts and Design Guides illustrating the oft times empirical nature of applied engineering tasks. Underpinning each topic will be constant reference to the evolution of the practices and their relationship to current theory. In particular, there will be constant reference to the life and reliability to be expected from solutions.

**Syllabus:** [Integration of machine elements into design.] Overview of common engineering materials and their functional properties. Review of steels and heat...
ME6032 - ADVANCED AIRCRAFT STRUCTURES
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering
Stress analysis of aircraft components: Tapered wing spars and box beams; beams having variable stringer areas; cut-outs in fuselages; fuselage frames and wing ribs, principles of stiffener/web construction.
Fatigue of aircraft structures: Safe life and fail-safe structures; designing against fatigue; fatigue strength of components; prediction of aircraft fatigue life; crack propagation.
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: Boiled 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.

ME6052 - FRACTURE MECHANICS
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical Engineering
Definition of strain energy density, strain energy, energy release rate and compliance. Determination 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
Mechanical, Aeronautical and Biomedical 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 time-temperature-shear rate, fibre preform permeability, £arcy flow. Advanced manufacturing techniques being developed within the Composite Research Centre including autoclaving, liquid composite moulding (LCM) £ RTM, RFI, VARTM; Hot-drape forming. Filament winding/tape-placement. Engineering design guidelines when using composite materials.

ME6092 - RENEWABLE ENERGY TECHNOLOGIES
ECTS Credits: 6
Mechanical, Aeronautical and Biomedical 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.
- 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 tides, 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
Mechanical, Aeronautical and Biomedical 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.).

MF4728 - OCCUPATIONAL PSYCHOLOGY
ECTS Credits: 6
Design and Manufacturing Technology

Rationale and Purpose of the Module: Engineers usually have to accept managerial positions, for which skills, knowledge and methods of occupational psychology are useful.

Syllabus: Students are encouraged to present and reflect on their own work experience, including co-op, and to be able to present relevant research to their peers.

MF4756 - PRODUCT DESIGN AND MODELLING
ECTS Credits: 6
Management and Marketing

Design and Manufacturing Technology

Rationale and Purpose of the Module: 3D parametric modelling systems are an integral part of the product design process. They are typically used to control key aspects of a product such as its design, communication, management, presentation, documentation and validation.

The aim of this module is to introduce students to these six key product design areas using SolidWorks in the context of generic best practice modelling strategies. In addition students will:
- Understand the primary issues and considerations involved in designing a new product and develop a creative approach to the solution of design problems.
- Understand the concepts and practices associated with 3D parametric modelling and visualisation technology.
- Model and develop products and components in contemporary computer modelling software.
- Be able to create comprehensive product models and specifications in the context of the total development of a product.
- Develop cognitive modelling/visualisation, problem-solving and decision-making 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. To enable students to integrate functional specialisms into an appreciation and application of strategy processes in both the private and public sector.

**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.

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**MG4058 - MANAGEMENT CONSULTING**  
ECTS Credits: 6

**Management and Marketing**

**Rationale and Purpose of the Module:** Contemporary management practice is a novel and action orientated module on the minor option in management for the BBS Degree. This module has a deep purpose: to deliver a transformational experience to BBS students minoring in management in the broad area of strategy as practice. There has been a movement in recent times to address the missing link of strategy; i.e. the strategist. The class are introduced in a structured and academically legitimate way to the life, times and strategic challenges faced by arguably the greatest global strategist of all time in the Western World: Alexander the Great. Through an interactive and engaging experience the class will see how rarely but significantly one person can make all the difference in strategically difficult times that resonate with the intense complexity of the business world that graduates will face and need to navigate.

**Syllabus:** Strategy Dimensions, Competitive Dynamics, Leadership, Strategy Process, Stakeholders, Resilience, Capabilities, Creativity, Strategic Innovation.

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**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

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**MI4408 - STRATEGY AND KNOWLEDGE MANAGEMENT**  
ECTS Credits: 6

**Management and Marketing**

**Rationale and Purpose of the Module:** To provide a strategic perspective on the role of knowledge, information and technology in organisations.

**Syllabus:** Develop the role played by technology in market and organisational transformation. Develop planning processes for the strategic use of the information resource. Provide students with an appreciation of the need to manage knowledge as an organizational resource and the infrastructural requirements to facilitate this.

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**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 core concepts of 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.
**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

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**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.


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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 in 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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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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**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;

- Zeroes 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:** MS4021

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**MS4028 - STOCHASTIC DIFFERENTIAL EQUATIONS FOR FINANCE**

ECTS Credits: 6

**Mathematics & Statistics**

Rationale and Purpose of the Module: Methods of stochastic dynamics applied to finance, and with reference to problems involving stochastic differential equations from physics and engineering.


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: 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: MS4213, MS4217

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 reinforce the development of the students “thinking” skills, and should enable them to undertake further study in the various applied areas of Discrete Mathematics (coding, graphs, logic and formal systems etc)

Syllabus: Review of sets and operations on sets, power sets.

Propositional logic, truth tables, propositional calculus, equivalence.

Predicate logic, quantifiers, equivalence, application to (mathematical) proof.

Cartesian product of sets, relations, equivalence relations, matrix representation of relations, composition of relations, functions, types of functions.

Number systems, natural numbers, integers, rationals, reals, axioms for N, proof by induction, recursive definitions and algorithms, recurrence relations.

Representations of N (binary, octal, etc), other number "fields".

Introductory combinatorics, permutations, combinations.

Prerequisites: MS4422

MS4122 - 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 R^n and 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 R^n and 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
Consequence of this omission is that statistical tools are totally absent from MS4212. One of the subject areas statistics and probability. As things stand, probability is completely absent from Leaving Certificate mathematics in the 1990s, and begin to lay the foundations 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 suitable software packages.

MS4218 - 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; deseasonalisation of 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 module 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 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 introduce 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 techniques to realistic problems.

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.

First-order and second-order Karush-Kuhn-Tucker (KKT) conditions for general non-linearly constrained problems.

Unconstrained Optimisation. Univariate Functions: Line Searches.

Constrained Optimisation. Penalty and Barrier Function Methods.
Computational limitations of penalty function methods - ill-conditioning. Exact Penalty Function Methods.
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; spherically symmetric solutions and Bessel functions; cylindrically 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

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

Dynamics: mass, force, Newton/Einstein's laws of motion, friction, Newton's Law of Gravity, planetary motion

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: 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

MT4002 - MATERIALS 1
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: This is a course in Engineering Materials for students with no previous back-ground 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.

MT4208 - MATERIALS SELECTION AND DESIGN
ECTS Credits: 6

Civil Engineering and Materials Science

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.

Syllabus: [The interaction between material properties and engineering design criteria, in designing components and products for manufacture]

MT4518 - SURFACE TECHNOLOGY
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To acquaint engineers and technologists with the concepts of corrosive degradation and wear processes and to give methodologies by which these processes can be decelerated by the use of electrochemistry coatings heat treatments or mechanical working.


MT4943 - MATERIALS PROCESSING
ECTS Credits: 6

Civil Engineering and Materials Science

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


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.
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 ò 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.

PD4004 - DESIGN VISUALISATION
ECTS Credits: 6

Design and Manufacturing Technology

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: This module comprises three complimentary streams, Design Methods, Design Techniques and Design History. These combine to introduce the student to the designed product in total taking into account practical considerations, aesthetics and social conditions.

Design Methods:
- 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 - basic ergonomic design techniques - 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 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 design problem solving have to compromise to reach optimal solutions.

PD4102 - DESIGN STUDIO 2
ECTS Credits: 6

PD4104 - DESIGN STUDIO 4
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To effectively develop, 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. Collate, analyse and synthesise research findings for design ideation. In-depth user testing and analysis. Improve concept development skills through exploration of idea generation techniques. Develop an ability to effectively progress concepts through iteration. Critique and evaluate concepts. Develop an appreciation for design detailing. Develop knowledge of design manufacturing processes and materials. Advance design communication skills. Utilise leading edge technologies in communication of designs. Develop an ability to reflect on personal design work. Application of this theory to their own work through project based studio classes.

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.

PD4124 - CONTEMPORARY DESIGN CULTURE
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To allow
Physics and Energy

ECTS Credits: 6

Rationale and Purpose of the Module: *To provide a working knowledge of the operation of some medical equipment

*To introduce the student to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes.

*To give the student a working knowledge of the operation of the equipment.

Prerequisites: PH4011

PH4018 - MEDICAL INSTRUMENTATION
ECTS Credits: 6

Physics and Energy

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.

Syllabus:

- Introductory level.
- Clinical monitoring: ECG - Electro cardiomgram, electrical function of the heart; EEG - Electro encephalo gram, electrical function of the brain; EMG - Electro myelo gram, electrical function of the muscle; Pulse Oxymetry, 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.

PH4012 - PHYSICS FOR ENGINEERS 2
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: Continuation of an introductory course in physics (PH4011) for engineering students.

Syllabus:


PH4008 - HYDROCARBON FUELS
ECTS Credits: 6

Physics and Energy


PH4022 - Physics for Environmental and Biosciences  
ECTS Credits: 6  

Physics and Energy  

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.


PH4038 - ENERGY STORAGE  
ECTS Credits: 6  

Physics and Energy  

Fundamentals of advanced energy conversion and storage.  


Reservoirs and storage capacity. Comparison of storage by conventional hydroelectric plants, tidal hydroelectric plants and pumped storage. Response times.


PH4042 - THERMAL PHYSICS  
ECTS Credits: 6  

Physics and Energy  

Rationale and Purpose of the Module: The purpose of this module is to enhance students understanding of key concepts and models associated with 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 Joule's 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: PH4131
PH4048 - FIRST / SECOND GENERATION BIOFUELS
ECTS Credits: 6

Physics and Energy

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 hydrosis, 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. Bioysngas upgrading Fischer-Tropsch (FT) diesel, water gas shift gs, synthesis, hydrocracking, Methanol Biomethanol gasification. MTBE Bio-MTBE synthesis methanol and isobutylene; DME biodimethyleneether, 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.

PH4058 - TRANSPORT
ECTS Credits: 6

Physics and Energy

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 and Energy

Rationale and Purpose of the Module: The purpose of this module is to enhance the students’ understanding of key concepts associated with electromagnetism. The objectives are to first present a general vector analysis, then to introduce electric and magnetic field concepts followed by analysis of specific physical problems using vector calculus. Secondly, the students will be introduced to the fundamental properties of electric and magnetic materials. The final objective is to introduce the students to the unified theory of electromagnetic waves and its application in matters and simple physical systems.

Syllabus: Vector methods: div, grad, curl; line, surface and volume integrals; Electric field E: electric charge, Coulombic law, electric field E, Gaussc law, divergence of electric field, the Dirac delta function; Magnetic field; magnetic field B, Biot-Savart law, Ampere’s law, Lorentz force; Electromagnetic induction: emf, Faraday’s law, generators and motors; Maxwell’s equations in vacuum: integral and differential form, monopoles; Energy and potential: energy density in E and B fields, scalar potential V and vector potential A; Dipole and multipole: electric dipole p, magnetic dipole m, electric multipole; Conductors: Hall effect; Dielectrics: polarisation P, displacement D, high permittivity, electric susceptibility, dielectric constant; Magnetic materials: diamagnets, paramagnets, ferromagnets; magnetic intensity H, magnetisation M, magnetic susceptibility, inductance, transformers; Maxwell’s equations in matter: Maxwell’s equations in terms of H and D; Boundary value problems: Poisson’s equation, Laplace’s equation, uniqueness theorem, images; Circuits: transients, reactance, power, and impedance.

Prerequisites: PH4131

PH4092 - SEMICONDUCTOR DEVICES
ECTS Credits: 6

Physics and Energy

The objectives are to first present a general vector analysis, then to introduce electric and magnetic field concepts followed by analysis of specific physical problems using vector calculus. Secondly, the students will be introduced to the fundamental properties of electric and magnetic materials. The final objective is to introduce the students to the unified theory of electromagnetic waves and its application in matters and simple physical systems.

Syllabus: Vector methods: div, grad, curl; line, surface and volume integrals; Electric field E: electric charge, Coulombic law, electric field E, Gaussc law, divergence of electric field, the Dirac delta function; Magnetic field; magnetic field B, Biot-Savart law, Ampere’s law, Lorentz force; Electromagnetic induction: emf, Faraday’s law, generators and motors; Maxwell’s equations in vacuum: integral and differential form, monopoles; Energy and potential: energy density in E and B fields, scalar potential V and vector potential A; Dipole and multipole: electric dipole p, magnetic dipole m, electric multipole; Conductors: Hall effect; Dielectrics: polarisation P, displacement D, high permittivity, electric susceptibility, dielectric constant; Magnetic materials: diamagnets, paramagnets, ferromagnets; magnetic intensity H, magnetisation M, magnetic susceptibility, inductance, transformers; Maxwell’s equations in matter: Maxwell’s equations in terms of H and D; Boundary value problems: Poisson’s equation, Laplace’s equation, uniqueness theorem, images; Circuits: transients, reactance, power, and impedance.

Prerequisites: PH4131
Physics and Energy

Rationale and Purpose of the Module: To introduce the student to the physics of solid state electronic devices and to their application
To introduce the student to semiconductor devices, electronic logic and digital devices

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 of 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/async synchronous, 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 and Energy

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, alpha, beta and gamma radiation, the law of radioactive decay. Fission and fusion; nuclear reactors. Detection, dosage.

Prerequisites: PH4071, PH4805

PH4132 - MODERN PHYSICS
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: This module will develop the student’s understanding of fundamental concepts and ideas in modern physics, specifically the use and application of the Schroedinger equation, and the principles of special relativity.

Syllabus: Wave mechanics: De Broglie’s hypothesis, wave functions and probability amplitudes, the Heisenberg Uncertainty principle. The Schroedinger wave equation: simple solutions in one dimension, transmission, reflection and penetration at a barrier, tunnelling, potential wells, the harmonic oscillator. The Schroedinger equation in three dimensions: the hydrogen atom, quantisation of angular momentum, spatial quantisation, the Zeeman effect. Spin: the fourth quantum number, the Pauli exclusion principle. Special Relativity: Relativistic dynamics, relativistic mass and momentum, total energy, mass/energy equivalence. Spacetime: spacetime diagrams, introduction to four-vectors. Application of relativistic dynamics to particle beam devices and collision experiments. Nuclear Physics: Nucleons and nuclear models, nuclear spin, nuclear reactions and cross-sections. Introduction to elementary particles and the Standard Model.

Prerequisites: PH4102

PH4608 - SOLID STATE PHYSICS 2
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: The purpose of this module is to enhance the students' understanding of key concepts in solid state physics, magnetism, superconductivity and low dimensional systems.

PH5095 - NANOSCIENCE AND TECHNOLOGY 2
ECTS Credits: 6

Physics and Energy

Rationale and Purpose of the Module: The purpose of this module is to enhance the students’ understanding of key concepts 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.


PH6022 - REPORTING RESULTS IN PHYSICAL SCIENCE
ECTS Credits: 6

Physics and Energy

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.

PH6031 - PHYSICS OF MEDICAL INSTRUMENTATION
ECTS Credits: 6

Physics and Energy

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 measurement 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.
regulatory environment.
* To give the student a working knowledge of the operation of some medical equipment
* To introduce the student to the scientific basis of the well known radiological equipment commonly in use in our hospitals and medical research institutes.
* To provide a working knowledge of the operation of this equipment.

**Syllabus:** Introduction to regulatory bodies in the EU and US: CE, FDA etc.; 21 CFR, 510k, Medical Device Directive, Investigational Device Exemptions; Electrical isolation standards, implementation options; Laser Safety - EN 60825. Measurements in biological systems: obtaining a reference, ratiometric analysis, clinical requirements, Physiological monitoring; Invasive/non-invasive, Probes - Electrical, fibre optic, non-contact. Vital signs monitoring: ECG- Electro cardio gram, electrical function of the heart; EEG- Electro encephalo gram, electrical function of the brain; EMG- Electro myelo gram, electrical function of the muscle; Pulse Oximetry, optical measurement of arterial blood oxygen saturation; MAP- mean arterial pressure. Introduction to radiation transport in tissue: absorption/scattering theory (Mie, Rayleigh Gans), bulk scattering and bulk absorption, anisotropy, typical values for radiation transport properties, Monte Carlo modelling. X-RAY/CT: X-RAY generation and propagation, Introduction to tomography, Computed Tomography - Slicing the living human body. Ultrasound: Doppler effect, high frequency ultrasound, limitations. MRI/MRS: Magnetic Resonance basics, the hydrogen nucleus, proton spin and quantum mechanics; 3D map of hydrogen atoms and hence content of the sample volume. Properties and amount of water in tissue, distinction between contrast and content imaging.

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**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 3rd 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.

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**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
Personnel & Employment Relations

Rationale and Purpose of the Module: This module is designed to give students an understanding of key concepts in Organisational Behaviour. It seeks to describe the complex work organisation from a behavioural perspective and it evaluates the methodologies available for analysing organisational behaviour. In an attempt to provide some answers to the ¿why¿ of human behaviour in the workplace, selected individual, group and organisational processes are introduced and explored.

Syllabus: Organisational Behaviour in perspective: Introduction to the field and paradigms of study; Defining the concept; disciplinarily and interdisciplinary nature of the field; dominant methodologies for understanding the social world. Personality: Defining personality; sources of personality difference; the nature/nurture debate. Perception and Cognition: The nature of perception; perception and perceptual influences; the process of perception. Motivation; theories of motivation; Learning & the Individual: Defining learning and theories of learning. Stress & Psychological Well being: stress at work; stress and performances; psychological well-being and self esteem. Groups & Team Roles: What is a group in psychological terms; function of groups; Hawthorne studies; the group formation process. Power, Politics and ethics: Interrelated concepts; sources of power; the use of power; political tactics and their use and legitimacy in organisational life. Leadership: theories of leadership; Organisational culture; diagnosing organisational culture; Schein's typology; formation and maintenance.

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.


PM4022 - PRINCIPLES OF ORGANISATIONAL BEHAVIOUR
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: This module is designed to give students an understanding of key concepts in Organisational Behaviour. It seeks to describe the complex work organisation from a behavioural perspective and it evaluates the methodologies available for analysing organisational behaviour. In an attempt to provide some answers to the ¿why¿ of human behaviour in the workplace, selected individual, group and organisational processes are introduced and explored.

Syllabus: 1 Introduction: What are psychometrics and psychological testing? 2 Contextualising psychometrics - The role of psychometrics in the selection process. 3 An introduction to job analysis, and its role in selecting tests. 4 Intelligence and cognitive ability- definitions and theories. 5 Measuring intelligence and cognitive ability. 6 Personality - definitions and theories. 7 Considerations in choosing a selection method: Sensitivity, validity and bias in measurement; Ethical and Professional Issues in Testing. 8 Administering tests. 9 Interpreting tests and giving feedback. 10 Psychometrics and job performance. 11 Some recent advances: attitudes, and motivational approaches; Computer-based testing. 12 Relating psychometrics to other scientific methods of selection: interviews, and assessment centres.

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 associated with human resource management 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, perception, attitudes, the psychological contract and individual motivation. Group development: structures and roles, the dynamics of groups and teams, communication processes particularly in an intercultural context. organisational leadership and organisational citizenship behaviour are also examined.

PM4028 - PSYCHOMETRICS AND PSYCHOLOGICAL TESTING
ECTS Credits: 6

Personnel & Employment Relations

Rationale and Purpose of the Module: 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.

Syllabus: 1 Relating psychometrics to other scientific methods of measurements. 2 Understanding the role of psychometrics in people selection. 3 An introduction to job analysis, and its role in selecting tests. 4 Intelligence and cognitive ability- definitions and theories. 5 Measuring intelligence and cognitive ability. 6 Personality - definitions and theories. 7 Considerations in choosing a selection method: Sensitivity, validity and bias in measurement; Ethical and Professional Issues in Testing. 8 Administering tests. 9 Interpreting tests and giving feedback. 10 Psychometrics and job performance. 11 Some recent advances: attitudes, and motivational approaches; Computer-based testing. 12 Relating psychometrics to other scientific methods of selection: interviews, and assessment centres.
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.

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PN4014 - PREPARATION AND PLANNING FOR TECHNOLOGY TEACHING (MATERIAL AND ENGINEERING TECHNOLOGY) ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: This module will provide students with the opportunity to plan and prepare for their specific school placement. The focus of the module is to consolidate the discipline knowledge and skills with pedagogical knowledge in preparation for engaging and developing school context knowledge. Following the preliminary school placement visit, the module will focus on three distinct aspects of specific planning and preparation: Consolidation, audit and mastery of core skills and processing techniques, tailored pedagogical resources and the provision of a safe environment to support effective learning. The synergistic relationship between effective planning, delivery, discipline, pedagogy, learning, reflection, management and health and safety will be reinforced supporting the development of a construct of teacher professional knowledge.


Skills Audit: Measurement, Marking out, Bench Skills, Soldering, Vacuum Forming, Riveting, Drilling, Turning.

Health and safety: Classroom layout and size, Class size, Fire safety, Electrical safety, Machinery safety (Provision and audit), Environmental Hazards (noise, dust, thermal jointing, etc.), Housekeeping (organisation, obstructions and cleanliness), Manual handling, Lighting, Signage, Personal Protective Equipment (PPE). Planning for safety, hazard identification and risk assessment.

PN4015

PN4206 - PROCESS TECHNOLOGY 4 (ED) ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To introduce further essential material and so provide the student with a balanced experience in the study of material processing techniques. To further develop the students' analytical abilities in the area of machine design. To apply the knowledge and skills acquired in previous modules to a substantial design and make project.


Prerequisites: PN4015, PN4105

PN4306 - DESIGN & COMMUNICATION GRAPHICS 2 ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: To extend the students' applied graphical problem-solving skills and broaden their body of design and communication graphics knowledge.
To equip students for the challenges of teaching design and communication graphics topics in final year teaching practice.

To further develop the students’ capabilities and competencies in the use of advanced parametric modelling tools to create increasingly complex product geometries.

To introduce students to the pedagogical applications of 3D CAD in developing teaching resources for design and communication graphics and in solving design problems. To develop the students’ knowledge of 3D CAD pedagogy.


**PO4004 - GLOBAL POLITICAL ECONOMY**

**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 ÆDevelopmentÆ from the 1930s (with a Tanzanian case study) African poverty: Æthe bottom billionÆ Urbanisation and urban politics: Lagos Structural adjustment and market reform (Zambian case study) Democratisation in the 1990s (Ghanaian case study) Democratisation in the 1990s (South Africa) The developmental consequences of democratisation War and peace in Africa: Sierra Leone ÆThe politics of the bellyÆ: the patrimonial politics in Central Africa New social movements.

**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 political and judge it against change.

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

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

PO4118 - IRELAND AND EU MEMBERSHIP: ADAPTING POLITICS, POLICY AND POLITY
ECTS Credits: 6

Politics and Public Admin

Rationale and Purpose of the Module: This module aims to examine the nature and impact of Ireland membership of the EU. To explore the theoretical interpretations of Europeanisation. To systematically investigate the impact Europeanisation has had on selected policy domains in Ireland. 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 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.

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 psychology 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.

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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 indepth 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.

Prerequisites: PS4011

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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 studentÆs 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 through the use of selected examples. Students are encouraged to become increasingly familiar with SPSS for coding of data and simple inferential statistics are introduced.

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PS4097 - DEVELOPMENTAL PSYCHOPATHOLOGY
ECTS Credits: 6

Psychology

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

Syllabus: The specific focus of this module is
developmental psychopathology. Developmental psychopathology is a domain of psychology which concentrates on how psychosocial and biological factors contribute to psychological adjustment and maladjustment. The module will introduce students 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: PS4012

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**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:** 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

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**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: PS4012

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**PT4001 - SUSTAINABLE DEVELOPMENT**
ECTS Credits: 6

**Design and Manufacturing Technology**

**Definitions and contexts for understanding social and human aspects of sustainable development, critical thinking, challenging assumptions, examination of knowledge creation, 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, life cycle thinking, behavioural thinking, systems change and intervention, creativity and innovation, corporate social responsibility, ethical investment.

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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**PT4004 - INTRODUCTION TO QUALITY MANAGEMENT**
ECTS Credits: 6

**Design and Manufacturing Technology**

**Rationale and Purpose of the Module:** The aim of this module is to give an effective and functional overview of

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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.

**Syllabus:**
1. What is Quality and why is it important?
2. Quality Control / Assurance;
3. Quality Management Systems,
4. Development of Total Quality Management;
5. Continuous Improvement;
6. Documentation, Audits, Standards (ISO9000:2000);
7. Human Resource issues,

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**PT4012 - DECISION SUPPORT TOOLS**
**ECTS Credits: 6**

**Design and Manufacturing Technology**

**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.


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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**PT4014 - PLANT AUTOMATION**
**ECTS Credits: 6**

**Design and Manufacturing Technology**

**Rationale and Purpose of the Module:** To introduce the student to fundamental control systems within automation. 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, SMEA control. Material storage systems, retrieval systems, carousels.

Automated Identification: Bar-coding, 1D barcode, 2D barcodes, Radio Frequency ID, smart sensors Å linked to production control and warehousing.

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**PT4008 - DELIVER AND RETURN WITHIN SUPPLY CHAINS**
**ECTS Credits: 6**

**Design and Manufacturing Technology**

**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 i.e. 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.

**Syllabus:**
- Concepts of Logistics and Distribution, Introduction to history and development, Channels of distribution, Planning framework for logistics, Logistics network planning and management.
- Physical Logistics Planning Warehousing, stocking, order-picking, Transportation, modes of transport, intermodal freight.
- International Contracting in Logistics International Contracts, Customs, Regulations, Incoterms, Managing transaction risk, payments, exchange rate exposure.
- Regulation and Green Logistics Reverse logistics and product lifecycle management, return of goods at end of life, Logistics and the environment.
MANAGEMENT
ECTS Credits: 6

Design and Manufacturing Technology

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 you to the role that Quality Management plays in the workplace
2. Make you aware of the how to implement a range of quality and tools
3. Inform you about the impact that quality has on the organisation as a whole

2. Total Quality Management, human resource issues, sourcing policy
3. Quality Costs
4. Problem solving tools
5. Benchmarking and Quality Function Deployment.

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PT4112 - MANUFACTURING TECHNOLOGY 2
ECTS Credits: 6

Design and Manufacturing Technology

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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PT4424 - 3D CAD MODELLING
ECTS Credits: 6

Design and Manufacturing Technology

Rationale and Purpose of the Module: 3D parametric modelling systems are an integral part of the product design process. They are typically used to control key aspects of a product such as its design, communication, management, presentation, documentation and validation.
The aim of this module is to introduce students to the core concepts, procedures and techniques used to create parts, assemblies and drawings while capturing correct design intent using the SolidWorks parametric modelling system. Students will learn how to correctly model parts, mate parts in assemblies, generate assembly and detail drawings, create photorealistic renderings, and animate assemblies. All modelling tasks are carried out using generic best practice modelling strategies.

Syllabus: The engineering design process and the 3D feature based model as a design database; its relevance to concurrent engineering; design visualisation; creating features; surface, solid and parametric modelling and design; design intent: planning parts for design flexibility; relations and equations; parametric dimensions; modelling for manufacture and assembly; design for manufacturing; assembly models and drawings; drawing documents; BOMs; design of simple jigs and fixtures; 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. The CAD database and other downstream applications; FEA analysis and design validation; photorealistic rendering and product animation.

Prerequisites: PT4121

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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; nerve structure and function, nerve transmission; the action potential, the neuromuscular junction, neurotransmitters; The central nervous system, the peripheral nervous system, 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; an introduction to, 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.).

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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 technologies required for the design, integration and operation of Modern Robots including industrial robotic arms and mobile robots.


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

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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.


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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:

To introduce students to the theoretical approaches used in languages, literature and cultural studies;
To equip students with the necessary skills to carry out a research project and to present findings appropriately;
To equip students with the research skills for sourcing, storing and presenting research data;
To enhance students' awareness of the information technology skills necessary to develop the above research skills.

Syllabus: Students undertaking research in languages, literature and cultural studies will be introduced to the theoretical approaches used by researchers in each of these disciplines and will engage in the evaluation of the critical readings of scholars in their discipline in light of such theoretical frameworks. Incorporating a practice-based element, students will be equipped with the necessary skills to design and carry out a research project in their selected discipline. Through small group discussion- and writing-focused workshops, students will be engaged in activities to develop the appropriate skills to collect, interpret and present research data appropriately, and to share their research findings with peers in verbal, visual and written forms.

Prerequisites: RM4001

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SE4006 - SCIENCE TEACHING 3
ECTS Credits: 6

Life Sciences

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.

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SE4014 - TEACHING SCIENCE 1
ECTS Credits: 6

Life Sciences

Rationale and Purpose of the Module: Elements of Teaching 1 and Teaching 2 (existing modules SE4014 and SE4024) are being incorporated into a single module, in order to facilitate restructuring of the LM092 programme to comply with accreditation requirements of the Teaching Council.

Syllabus: Junior Certificate Science syllabus; rationale, structure, content and assessment; cross-curricular aspects. Transition from Primary to Second level; Curaclam na Bunscoile. Application of learning theory to the teaching of science; teaching methodology; project work; critical reflection; classroom/workshop/laboratory exercises and organisation; data loggers, their use and integration into the teaching of science. Preparation and evaluation of schemes of work and lesson plans.

Teaching resources, to include the range of teaching aids and textbooks, e-learning resources, learning enhancement possibilities.

The management of active learning situations in the laboratory and the field; design and execution a wide range of laboratory and field-based investigations and experimental work reflective of the objectives of the Junior Science syllabus; evaluation of their effectiveness as an aid to teaching and learning. Preparation of laboratory chemicals and reagents; using the natural environment as a teaching resource. Laboratory safety considerations; safety, efficiency and expertise in a range of common junior cycle laboratory procedures; legal responsibilities, accident response and reporting.

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SO4002 - GENDER: SOCIOLOGICAL PERSPECTIVES
ECTS Credits: 6

Sociology

Rationale and Purpose of the Module: The aim of this module is to introduce the students to sociological approaches to gender including the main theoretical frameworks in the study of gender and society.

Syllabus: This module equips students with a critical understanding of key concepts in gender studies and feminist thought and how these are informed by, and inform, sociological enquiry. It offers in introduction to the main sociological perspectives on gender; key debates in feminist theory; debates in the study of masculinity; and perspectives on substantive topics such as work and care in the context of these frameworks. The module also examines the operation of gender divisions across national and transnational social contexts and their articulation with other major social divisions such as class, sexuality, ethnicity and race.

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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
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 introduces students to the discipline and field of sociology, including the work of contemporary sociologists, and to provide them with a strong foundation of knowledge in preparation for further sociology modules.

In addition to enhancing students awareness and understanding of key sociological concepts, theories and issues, this module is oriented to developing students' 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

SO4036 - CONTEMPORARY SOCIOLOGICAL THEORY
ECTS Credits: 6

Sociology

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

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

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 of 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.

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:**

- To provide an opportunity for the student to examine of key theoretical perspectives relevant to the study of gender and popular culture
- To offer ways of evaluating the work of major sociological schools/theorists in the study of popular culture and gender studies.
- 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 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 sexuality 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.

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**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 `culture¿ and 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 relationships between gender, cultural diversity and global capitalism; how multiculturalism can bring about more social justice; how multiculturalism can be deconstructed; and how gender relations affect and are affected by multicultural strategies for negotiating difference.

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**SO4118 - SOCIOLOGY OF GENDER AND POPULAR CULTURE**  
ECTS Credits: 6  
**Sociology**

**Rationale and Purpose of the Module:**

- To provide an opportunity for the student to examine of key theoretical perspectives relevant to the study of gender and popular culture
- To offer ways of evaluating the work of major sociological schools/theorists in the study of popular culture and gender studies.
- 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 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 sexuality 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.

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**SO4158 - SOCIOLOGY OF HIGHER EDUCATION**  
ECTS Credits: 6  
**Sociology**

**Rationale and Purpose of the Module:**

- To understand and to explore key theoretical perspectives on higher education
- To critically engage with examples of empirical research on higher education nationally and internationally
- To encourage and to enable critical and analytical thinking about the nature and purpose of higher education and its relationship with the state, with industry and with civic society
- To understand the processes operating within higher
Syllabus: This module aims to provide students with an understanding of the sociology of Higher Education internationally and the processes impacting on it, including globalisation, massification; managerialism and masculinisation. It will locate these changes in the context of changing paradigms of Higher Education in Ireland and its nature and purpose. Policies related to Higher Education will be explored in the context of its relationship with the state, the economy and the paradox of gender. The relationship between students social class position; state’s encouragement of access policies and its perceived elite/non-elite character. Issues related to managerialism versus collegiality; career paths; organisational culture; leadership styles; the gendering of academic and senior management in Irish Universities and internationally; the factors explaining such variation will be explored. Similarities and differences between academic and senior management in Universities and other types of higher education institutions. The future of Higher Education.

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. 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 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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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 masculinity, 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

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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/Es 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: 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: SP4133

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 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 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.

Prerequisites: SP4141

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: 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.

Syllabus: Tutorials: Working with set textbook, complementary audio-visual material, as well as advanced literary texts.

Prerequisites: SP4133, SP4143, SP4134, SP4934

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:
* Enable the student to understand and use basic structures of Spanish grammar.
* Expose the student to a range of vocabulary and expressions which will allow her/him to present her/himself to, and communicate with native speakers of Spanish.
* To foster autonomous language learning skills.
* To introduce the student to Spanish and Latin American cultures.
* To develop listening and speaking skills in Spanish.
* To equip the student with basic writing skills.

Syllabus: 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 and 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/Es knowledge of the structures of Spanish grammar.
* Expand the student/Es range of Spanish vocabulary.
* Improve pronunciation and patterns of intonation in Spanish.
* Further develop the student/Es language skills by exposing them to different situation and registers, both formal and informal.
* Facilitate the student/Es 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

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: SP4243, SP4233

SP4622 - INDIGENISMO AND NEGRISMO IN LATIN AMERICA LITERATURE
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Aims & Objectives:
To analyse Latin American literature from the marginalised perspective of two distinct ethnic groups as a way of examining the authenticity and specificity of Latin American peoples and their literature. To broaden and enrich studentsÆ critical thinking by exposing them to issues closely related to the quest for human rights and freedom of marginal groups in Latin America.

Syllabus: Students will analyse poetry, novels and testimonies by/about black and indigenous populations to include some of the following: Alcides Arguedas (Bolivia), Jorge Icaza and Adalberto Ortiz (Ecuador), Miguel Angel Asturias (Guatemala), JosÚ MarÝa Arguedas, Enrique López Alb·jar and NicomÚdes Santa Cruz (PerÝ), Lydia Cabrera and Manuel Cofiño (Cuba) among others.

Prerequisites: SP4003

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 studentsÆ understanding of different literary and political discourses.
To further develop studentsÆ 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.

SP4808 - SPANISH LANGUAGE AND LITERATURE 1  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: Aims and Objectives: To analyse Latin American literature from the marginalised perspective of two distinct ethnic groups as a way of examining the authenticity and specificity of Latin American peoples and their literature. To broaden and enrich students critical thinking by exposing them to issues closely related to the quest for human rights and freedom of marginal groups in Latin America.

Syllabus: Students will analyse poetry, novels and testimonies by/about black and indigenous populations to include some of the following: Alcides Arguedas (Bolivia), Jorge Icaza and Adalberto Ortiz (Ecuador), Miguel Angel Asturias (Guatemala), José María Arguedas, Enrique López Albujar and Nicomedes Santa Cruz (Peru), Lydia Cabrera and Manuel Cofino (Cuba) among others.

SP4818 - SPANISH LANGUAGE AND LITERATURE 2  
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: 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.

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 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 recording 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.

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 the 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 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

SS4012 - EXERCISE AND HEALTH FITNESS FOR PHYSIOTHERAPISTS  
ECTS Credits: 6

Physical Education & Sport Sciences

SS4103 - 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 the 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

SS4318 - NOVEL METHODS IN BIOMECHANICS
ECTS Credits: 6

Physical Education & Sport Sciences

Rationale and Purpose of the Module: Aims * To give students an understanding of new and developing methodologies in the biomechanics of sport and exercise. * To give students an understanding of the applications of existing methods using novel and developing techniques of data analysis. * To provide students an understanding of the merits of mathematics for biomechanics research.

Syllabus: Syllabus

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.

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**SS4404 - COACHING AND SCIENCE PERFORMANCE 3**

**ECTS Credits:** 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** To give students a theoretical and practical learning experience in the areas of sport administration and organisation and sport coaching.

**Syllabus:** Administration and organisation: Structure and function of Irish NGB’s. National coaching development programmes. The module includes an introduction to the management issues related to sports administration and allows students gain practical experiences in the organization of a sports event. 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.

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**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 RICES 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.
* The role of medications in the treatment of injuries.
* The role of the sport scientist in the sports medicine team.
* Research in sports injuries.

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**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

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**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.


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**SS4552 - SPORT AND EXERCISE SCIENCES - IMMERSSION**

**ECTS Credits:** 9

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**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.

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**SS6032 - ENDURANCE SPORTS**
ECTS Credits: 6

**Physical Education & Sport Sciences**

**Rationale and Purpose of the Module:** Endurance is required in a wide range of sports activities and can be expressed in various forms depending on the duration and intensity demands of the activity. A wide range of factors influence performance in endurance activities including: Physiological, nutritional, biomechanics and psychological factors. This module will provide core knowledge of endurance development and an understanding of how the physiological, nutritional, biomechanical and psychological factors influence this development. The module will be delivered using a combination of lectures, lab sessions as well as case based and problem based learning activities. The emphasis of this module will be on gaining an understanding of the methodologies to develop an endurance based athlete and applying these techniques and methodologies in a practical setting.

**Syllabus:**
- Biomechanical Aspects of Endurance Development
- Biomechanical responses to fatiguing exercise:
  - Changes in movement pattern, muscle activation patterns, impact forces in response to fatigue.
  - Measurement of the biomechanical responses to fatigue using force platforms, EMG and Motion Analysis.
- Nutritional Aspects of Endurance Development:
  - Principles of nutrient intake for sports performance;
  - Macro and micronutrients; body water and fluid composition;
  - Nutrient intake and body composition;
  - Nutrient interaction with exercise and competition;
  - Adaptation and recovery.
- Physiological Aspects of Endurance Development:
  - Muscle adaptation to endurance training;
  - Cardiovascular and respiratory adaptation to endurance training;
  - Environmental effects of endurance training and competition.
- Central and peripheral fatigue in endurance exercise.

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**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.

**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;
- Complex strength conditioning training;
- Olympic Weightlifting;
- Programme design and implementation;
- Safety issues in strength/conditioning;
- 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;
- Nutritional requirements for strength sports.

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**TE4012 - 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. To provide integrated tuition and practice in the four language skills of listening, speaking, reading and writing.

**Syllabus:**
Students work from a set textbook, back-up audio visual and on-line material. Practice is given in the four language skills, language awareness-raising and with special emphasis on pronunciation at this level.

The following grammatical areas are covered: 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.
TE4022 - ENGLISH AS A FOREIGN LANGUAGE 2
(UPPER INTERMEDIATE)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide language support to students on the Erasmus exchange programmes to enable them to benefit more fully from their Erasmus experience at a social, cultural and academic level
To provide integrated tuition and practice in the four language skills of listening, speaking, reading and writing.

Syllabus: Students work from a set text book, back-up audio visual and on-line material. Integrated tuition and practice is given in the four language skills. The following grammatical areas are covered: adjective order, hypothetical time, countability and plural nouns, quantifiers, gerund or infinitive after verbs, clauses of contrast, clauses of purpose and reason, reporting verbs, use of the passive, as/like
Lexis: wordbuilding, homonyms, frequent collocations, common expressions, conversational responses and idioms, discourse markers (oral and written) e.g. connectives, sequencing, signposting.

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TE4032 - ENGLISH AS A FOREIGN LANGUAGE 2
(ADVANCED)
ECTS Credits: 6

School of Modern Languages and Applied Linguistics

Rationale and Purpose of the Module: To provide language support to students on the Erasmus exchange programmes to enable them to benefit more fully from their Erasmus experience at a social, cultural and academic level
To provide tuition and practice in the four language skills of listening, speaking, reading and writing.

Syllabus: Students work from a set text book, back-up audio visual and on-line material. Integrated tuition and practice is given in the four language skills. The following areas are covered: grammar; future forms, wishes and regrets, defining and non-defining relative clauses, noun clauses, adverb clauses, perfective v progressive aspect, gerunds, infinitives
Lexis: discourse markers, phrasal verbs, collocations, British v American English

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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.

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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 theory and practice of 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.

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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:

Prerequisites: TX4305
Design and Manufacturing Technology

Rationale and Purpose of the Module: To develop: A critical aesthetic awareness of the design of buildings and their relationship with their surroundings
The ability to make informed judgments on aesthetic and other considerations relating to buildings and the built environment
An appropriate vocabulary to discuss issues relating to craft standards, visual impact of buildings, sustainability and environmental considerations and the best use of space
The ability to make value judgments on general best practice relating to buildings and the built environment


WT4018 - ADVANCED TIMBER CONSTRUCTION
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: The aims of this module are
- that the student gains an insight into the use of wood in modern building design
- that the student develops a confidence and ability to defend, develop and promote the use of wood in competition with other building materials and systems

The objectives of this module are
- to introduce the context of current building practice in the use of wood and wood based components
- to integrate new ideas and innovations in the use of wood in construction in a global context
- to equip the student with the terminology and concepts involved in analysis and design of wood based constructions
- to introduce the concept of bend used of construction, particularly for humans using timber based constructions

conversion of the tree trunk material to seasoned, dimensioned wood

**Syllabus:** Wood:
- Moisture relationships in wood
- Nature of moisture
- Determination of moisture content
- Equilibrium dynamics and shrinkage
- Movement of water, capillarity, diffusion.

[Modification of wood-moisture relationship]
- Air-drying and natural seasoning
- Kiln drying, fundamentals of kiln-drying, defects, equilibrium
- Kilns, schedules and instrumentation
- Specialised seasoning methods

**Essential silviculture**
[Measurement, extraction, transportation and sorting of logs]
[Analysis of material optimisation] at forest and sawmill levels.
[Sawmill layout], processing technology and end use relationships.
Provision for [grading and drying] [Quality control].

**Prerequisites:** WT4102

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**WT4106 - ARCHITECTURAL TECHNOLOGY: MATERIALS TECHNOLOGY AND DESIGN**
ECTS Credits: 6

**Design and Manufacturing Technology**

**Rationale and Purpose of the Module:** To develop:
- An ability to select or specify materials which are appropriately used and are environmentally friendly and sustainable
- Pedagogical knowledge, skills, values and attitudes appropriate to the teaching of materials technology and design at second level


**Prerequisites:** WT4205, WT4006, WT4005

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**WT4107 - PULP, FIBRE AND BOARD MANUFACTURE 1**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**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.

**Syllabus:** Concepts in modifying wood: deconstruction, combination, chemical and physical changes. Conamination: fibres, pulping, mechanical, chemical, physical, chips, particles, veneer, sections.

**Fibre Products:** Papers manufacture, types, specification, modification, print requirements.
Cardboard, specification, corrugation, packaging.
Hardboard, insulation board.
Medium and high density fibreboard, manufacture, types, properties, end uses.

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**WT4202 - DESIGN STUDIO**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**Rationale and Purpose of the Module:** This active learning module introduces the students to teamwork and personal development skills. The module is non-repeatable and 100% continually assessed, the students are introduced to design concepts and are required to prepare reports, make presentations, undertake surveys, model building and testing exercises. The key objectives of this module are:
* To develop the student/EEs critical thinking skills.
* To empower the student with the skills necessary to undertake research.
* To promote the importance of teamwork

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**WT4208 - BUILDING SERVICES 2**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**Rationale and Purpose of the Module:** The aim of this module is to provide a comprehensive introduction to 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

**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, oil 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 flames; 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: WT4504

WT4304 - MACHINING TECHNOLOGY 2
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To introduce students to machine safety, set up, operation and maintenance.
To enable the students to select safe and appropriate manufacturing strategies and optimise machine production for a range of product assemblies.

Syllabus: Machine safety
Pne & dust, eye, and noise protection
Machine electricity and safety
Health and safety management
Spindle moulder
Planer moulder
Circuit board sawing and planning machines
CAD/CAM programming
Computer integrated manufacture
Maintenance of machines setting of planer knives etc
Machine selection/specification
Machine tooling

Prerequisites: WT4303

WT4404 - WOOD TECHNOLOGY 1
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: To enable the students to select materials, section profile and jointing mechanisms for the use of timber to satisfy specific end uses and environments of the primary and secondary elements of a domestic dwelling suitable for use in Ireland.

Syllabus: Timbers predominantly used in domestic dwellings
Timber frame cavity wall construction
Suspended timber ground floors
Upper floor construction
Stud partitions
Stair design and manufacture
Window design and manufacture
Door design and manufacture
Roof construction

Prerequisites: WT4303, WT4603

WT4502 - CONSTRUCTION TECHNOLOGY
ECTS Credits: 6

Civil Engineering and Materials Science

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 factors affecting drainage & foundation choice.
* Concrete technology and mix design.
* Environmental considerations in residential construction 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

WT4504 - BUILDING SERVICES 1
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: The aim of this module is to provide a comprehensive introduction to building services and associated technology.
Key objectives
* Introduction to active and passive building services in domestic construction.
* Understand design, build and operation implications of these services.

Syllabus: * Heating ventilation and air conditioning services; district heating, heat loss calculations, thermal insulation, ventilation, air filters, heat recovery systems; principles of air conditioning, dual 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; re-sealing and anti-siphon traps, air pressure in discharge stacks; irrigation systems, sewage pumping, refuse disposal systems; sewage disposal, settlement tanks, bio-filters.

Prerequisites: PH4032

WT4604 - LAND SURVEYING
ECTS Credits: 6

Civil Engineering and Materials Science

Rationale and Purpose of the Module: The aim of this module is to provide an understanding of principles of land surveying and the use of specialist surveying equipment. The principles and techniques of surveying are applied to a wide variety of realistic construction project applications.
The specific objectives are to provide:
* An understanding of surveying fundamental principles and use of surveying instruments

Prerequisites: PH4032
* Knowledge of the application of these to conduct land and site surveys
* Practical experience in using these modern instruments in the solving of a variety of site problem situations.

**Syllabus:** Surveying fundamentals, tape & offset surveying; levelling, the theodolite and its use, tension determination, steel taping differential levelling, traversing, angle measurement electromagnetic distance measurement, satellite positioning systems, survey methods, analysis & adjustment of measurements, areas & volumes, setting out, curve ranging, topographic surveying, construction control surveys, geographic information systems, global positioning systems, construction applications, field coding, automatic target recognition, typical field operations. Practical case studies and fieldwork.

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**WT4608 - PROJECT 2 WOOD SCIENCE**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**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:** WT4607

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**WT4704 - BUILDING MEASUREMENT**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**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.

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**WT4804 - ESTIMATING AND COSTING**
ECTS Credits: 6

**Civil Engineering and Materials Science**

**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.

The key objectives are to
* Describe the role of the estimator in the tendering process
* Illustrate standard estimating techniques and the process for preparing a cost estimate for building works
* Introduce value for money concepts and techniques to identify alternative solutions to deliver value for money.

**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.

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**WT4968 - SAFETY IN TECHNOLOGY CLASSROOMS:**
**LEGISLATION & PRACTICE 2**
ECTS Credits: 3

**Design and Manufacturing Technology**

**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.