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INTRODUCTION

MODULES:

The University of Limerick operates a modular system with continuous assessment. A module is a self-contained package of education taught during a single academic semester. Visiting students may choose from a wide range of modules and may cross register between faculties and departments. Acceptance on these modules is subject to academic prerequisites, timetabling constraints and ceilings on enrolments. The module descriptions that follow present an outline of the salient topics covered in each module.

Normal course load is 5 modules per semester.

MODULE CODES:

The first two letters of the code indicate the subject area to which the module belongs. Example CU6051
The FINAL numerical digit of the code corresponds to the semester of study in which the module is normally taken by Irish students i.e. 1, 3, 5, 7 are fall semester classes; 2, 4, 6, 8 are spring semester classes. These codes should be used as a guide to the level of each course. This is the usual key for classes but there are always exceptions.
AUTUMN SEMESTER MODULES
These are exciting times for the Kemmy Business School (KBS), which is home to 2,900 students and 100 faculty and staff. Founded in 1972 and renamed the KBS in 2003 the School consolidated its locational future in a new state-of-the-art building in September 2008 at the Limerick City end of the main UL campus. The new building incorporates a Wall St. style trading room, specialist HRM and Marketing laboratories, executive education teaching rooms, breakout rooms and a self-contained conference centre. We offer a wide range of business and management education opportunities at undergraduate and postgraduate levels that are of particular interest to international students. As a Study Abroad student at the Kemmy Business School you will join a welcoming, vibrant and exciting community of students and faculty. You will enjoy world class facilities during your stay with us and an academic environment that is second to none.
This module introduces the student to the fundamental concepts and practices of financial accounting. Accounting is presented as a manifestation of various social and political pressures, which required that techniques be developed to account for trading and wealth. The topics covered include accounting in its political, regulatory, historical, social, economic, corporate governance and international contexts; introduction to the theoretical, conceptual and regulatory frameworks of accounting; traditional accounting model; nature, purpose, scope and framework of auditing; the impact of information technology on accounting systems; capital, income and profit measurement; accruals, prepayments and adjustments; depreciation and stocks; distribution of profits; profit and loss accounts and balance sheets; cashflow statements; nature, purpose, scope and framework of auditing.

This module considers accounting principles and policies that apply to certain international accounting standards, from the perspective of external users of financial information (including equity holders). The pedagogic approach adopted here is the joint application of a theoretical and practical exploration of these specific international accounting standards. These advanced financial accounting issues include lease agreements, the cost of retirement benefits, earnings per share, group financial statements, accounting for provisions, contingent liabilities and assets, and the treatment of events after the reporting date. The complex accounting treatment of financial instruments is also examined, along with its continuous revisions. The accounting treatment of deferred tax is analysed to demonstrate how accounting rules differ from tax rules when calculating profit for tax purposes. These international accounting standards and issues are studied in light of their historical development and students are encouraged to critically examine current accounting regulations.

User needs, corporate report, decision-usefulness approach; accounting information and capital markets, efficient markets hypothesis; accounting information and security prices; financial market information; presentation of accounting information; companies acts, EU directives; analysis of financial statements; recognition and measurement issues; substance over form; performance indicators; ratio analysis; uses and limitations, of-balance sheet financing, creative accounting; corporate social reporting; forecasts and budgets.

Prerequisite AC4204

Objectives, scope and framework of management accounting; management accounting and organisation control; cost accumulation for stock valuation and profit measurement; product costing systems; application of cost-volume-profit techniques; marginal costing and non-routine decision making; accounting information for pricing decisions.

Prerequisite AC4204
### Accounting and Finance

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<td>FI4003</td>
<td>Principles of Risk Management (Autumn)</td>
<td>3 hours per week; 13 weeks/3rd semester; 26L/13L; ECTS credits: 6</td>
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| IN4003      | Principles of Risk Management (Autumn)    | Rationale And Purpose Of The Module:  
To introduce the students to concepts and principles relating to the management of risk in both the public and private sector. The student will be expected to understand basic mathematical and financial models in dealing with risk theory as well as understanding the basics of the central theories on risk.  
Syllabus:  
Concepts of risk, pure and speculative risk; actuarial mathematics and elementary risk theory; perceptions of risk; risk in the economic and legal environment; models of risk management; risk management as a decision making process; identification, analysis, evaluation, control, financing of risk; risk management in an organisation and in the public sector; formulation and implementation of risk management strategies; quality and risk management.  
Prerequisite FII4305 |
| IN4407      | Financial Institutions and Markets* (Autumn/4) | 3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6 |
| IN4005      | Risk Analysis (Autumn)                    | Rationale And Purpose Of The Module:  
To develop in the student an understanding of and insight into risk analysis.  
Syllabus:  
The students will gain a general understanding of risk analysis and produce some in-depth analysis.  
Prerequisite IN4003 |
| IN4427      | Insurance Organisations and Markets (Autumn) | 3 hours per week; 13 weeks/3rd semester; 26L/13L; ECTS credits: 6 |
| IN4007      | Governance and Risk (Autumn)              | 3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6 |
| IN4715      | Risk and Insurance (Autumn/2)             | 3 hours per week; 13 weeks/3rd semester; 26L/13L; ECTS credits: 6 |

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**Kemmy Business School**
IN4725 RISK AND INSURANCE (AUTUMN)

Rationale And Purpose Of The Module:
To meet the needs of the risk management and insurance industry by providing students with a strong understanding of how the insurance industry operates. Students will also learn the important principles underlying risk management. The interest in, and study of, risk has grown significantly due to improvements in the technology used to assess and measure risk and the development of innovations in the insurance and capital markets that control risk. Insurance is one of the main mechanisms used to control risk, through the transfer of that risk to a third party, usually an insurance company. The insurance company in turn is exposed to a variety of risks and can transfer some of these through reinsurance whilst other risks can be controlled using alternative markets. With the spiralling cost of health care and the changing demographic in Ireland and Europe there is significant focus on the health care market by the state and the insurance industry. This module will introduce students to...

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

IN4735 INSURANCE ORGANISATIONS (AUTUMN/4)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits: 6

The structure of the insurance industry; the functions of an insurance organisation; insurance organisation accounts and costing; the use of information technology; quality and insurance; captive management.

TX4007 TAXATION FOR CORPORATES (AUTUMN)
Rationale And Purpose Of The Module:
This module aims to provide an understanding of Irish Corporation Tax, the rationale for incorporation of a business, the taxation implications of close company status and the effective use of losses and group reliefs. It also introduces students to the principles of Value Added Tax (VAT) and the application of VAT in a business context.

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

TX4204 CAPITAL TAXATION
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits: 6

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

TX4305 TAXATION THEORY AND PRACTICE (AUTUMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits: 6

Tax theory, basic concepts; public failure and public expenditure growth; cannons of taxation; structure and administration of the taxation system, assessment, appeals, collection, audit and penalties; computation of personal income tax liability; efficient employee remuneration, benefits in kind, employee share schemes, the PAYE system; taxation of investment income, from financial instruments, dividends and real property; the business expansion scheme; tax planning, review of the tax based incentives; the Irish/UK double taxation treaty. Prerequisite: AC4203

ACCOUNTING AND FINANCE
ECONOMICS

EC4003 INTERMEDIATE
MICROECONOMICS (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

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

EC4004 ECONOMICS FOR BUSINESS
(AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

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

EC4027 THE EUROPEAN ECONOMY
(AUTUMN/)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

This module examines the economic, political and social aspects of the European Union, from the perspective of the Union as a whole, and from an Irish perspective. An understanding of the economic motives driving European integration and the effects of greater fusion of European national economies requires knowledge of markets in their microeconomic and macroeconomic aspects.

EC4035 ECONOMICS OF INTEGRATION (AUTUMN/2)
3 hours per week; 13 weeks/ semester; 26L/13T; ECTS credits:6


EC4045 ECONOMICS OF NATURAL RESOURCES (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

Nature, scope and key concepts of natural resource economics; market efficiency and sustainability; Optimal level of pollution; Public policy instruments (Tax, subsidy, emissions, trading, command and control); Economics of renewable resources (forestry and fishing); Economics of non-renewable resources (coal, oil and gas; uranium); Economics of bio-diversity wild life preservation; Natural resources and economic growth.

EC4101 MICROECONOMICS
(AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Scope and method economics; the theory of consumer choice; individual and market demand; theory of production; the costs of production; profit maximisation and the competitive firm; monopoly (including multivalent and price discrimination models).

EC4111 MICROECONOMICS (NON BUSINESS) (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Introduction: scope and method of economics; the theory of consumer choice; individual and market demand; theory of production; the costs of production; profit maximisation and the competitive firm; monopoly (including multivalent and price discrimination models).
EC4213 INTERMEDIATE ECONOMICS (FOR NON-BUSINESS) (AUTUMN)

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

EC4307 ECONOMETRICS (AUTUMN/4)
4 hours per week; 13 weeks/7th semester; 26L/26T; ECTS credits: 6


EC4333 ECONOMICS OF EUROPEAN INTEGRATION (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 39L; ECTS credits: 6

Introduction: member states’ major economic indicators; theory of economic integration (new international trade theories), and stages of economic integration; monetary integration - the road to economic and monetary union; the EU budget; the common agricultural policy; regional and social cohesion (polarisation trends; convergence; employment issues; impact of structural funds); industrial and technological policy; external economic relations of the EU; Lome Convention and EU-Asia relations; conclusion; current issues in European economic integration; diversity, flexibility and coherence of economic policies.

EC4407 IRELAND IN THE WORLD ECONOMY (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 39L; ECTS credits: 6

International demographic trends; labour force analysis - employment and unemployment trends; industrial change and industrial policy; Irish fiscal policy in an international context; Ireland and the European community - performance and prospects; sectoral developments in the International Economy - effects for Irish employment and output; discussion on international economics; trade theories.

EC4417 INDUSTRIAL ECONOMICS (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6


EC4427 MANAGERIAL ECONOMICS 1 (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

Constrained and unconstrained optimisation techniques; demand analysis, demand estimation (including introduction to econometrics); demand forecasting, decision-making under uncertainty, pricing models to account for production relationships, capacity relationships, demand relationships; transfer pricing, mark-up pricing; decision making in the public sector introducing the rationale and means of government intervention in the case of market failures, cost-benefit analysis; capital budgeting and investment decisions.
**MANAGEMENT AND MARKETING**

**CM4203 COMMUNICATIONS (AUTUMN/1)**
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Communications in its social, economic and cultural context: information society; role of new technologies; media: postmodernism; argument analysis, reasoning, structuring and defending arguments; persuasion: psychology of persuasion and motivation; advertising as persuasion, including codes of visual communication; persuasion and the spoken word; style: effective writing strategies for various contexts (academic, journalistic, informative, persuasive etc.); presentation.

**EP4013 ENTERPRISE, CREATIVITY AND INNOVATION**

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 enterprise, creativity and innovation in small and medium size enterprises. 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 process of managing innovation.

Syllabus:
This module commences with an introduction to the nature and development of entrepreneurship and emphasises the strong link between entrepreneurship and innovation. This leads to an overview of the schools of thought on entrepreneurship and an understanding of the entrepreneur and creative behaviour. The theories and models of both creativity and innovation are examined with contextual emphasis on radical and incremental innovation in products, services and processes; product strategy, and new product/service development. The identification of the intrapreneurial characteristics and the creation of an entrepreneurial spirit within a corporate environment. This leads to the application of creative thinking to identify venture opportunities, business planning, market entry strategies, marketing new inventions and technology transfer.

**EP4315 ENTERPRISE FORMATION**

Rationale And Purpose Of The Module:
The aim of the module is to provide participants with an understanding of the entrepreneurial process and the role of small firms in economic development. Students will also benefit from identifying the external and internal factors that impact on business start-up. Students are expected to prepare a feasibility analysis on a business idea to examine the viability of starting this business in a real-life situation.

Syllabus:
Mode of Instruction is lecture and tutorials workshops. Knowledge is structured in two main sections, theory and application of theory to real life economic conditions. Initially the concepts and factors affecting the entrepreneurial process are imparted to students, following which students work together in teams engaging in experiential learning in assessing the feasibility and viability of their business idea.

**EP4407 ENTERPRISE DEVELOPMENT**

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

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

**MG4031 MANAGEMENT PRINCIPLES (AUTUMN/1)**
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Management concepts and evolution, the business environment, functions of management, planning, organising, staffing, leading and controlling, decision making, organisation structure and design leadership, motivation, work design, organisational control introduction to ethics and social responsibility, change management.
MG4035 INTERNATIONAL MANAGEMENT (AUTMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

The domain of international management concepts of industry, location and firm specific advantage models of cross-border business, managing multinationals mergers and acquisitions and strategic alliances, international business networks, coordinating international value chains, extended supply chain management, technology diffusion, subsidiary initiatives, political and cross-cultural issues, managing in developing countries.

MI4007 BUSINESS INFORMATION MANAGEMENT (AUTMN/2)
5 hours per week; 13 weeks/3rd semester; 26L/13T/26L; ECTS credits:6

The course provides an historical perspective on the area of Information Management; the information society; the importance of databases for modern business; the implications of integrated databases to support enterprise-wide and intra-organizational business processes; developing information as a corporate resource; the firm as an information processing entity; types of business systems platforms in support of managerial and executive-level decision making, coordination of business processes; information management in functional areas of business: accounting, marketing, human resources, operations; managing ethical issues.

MI4305 DATA AND DECISION MAKING IN ORGANISATIONS (AUTMN/3)
5 hours per week; 13 weeks/5th semester; 26L/13T/26L; ECTS credits:6

This module introduces the business student to a perspective of the organisation as an information processing system. It introduces organisational decision-making principles as a foundation for the design of Information Systems. It studies the role of data and database management as a corporate resource for decision making and the business systems that support this; data mining, ERPs, CRMs. It covers corporate responsibility for data integrity and protection.

MI4407 SOCIAL & ECONOMIC ASPECTS OF INFORMATION MANAGEMENT (AUTMN/4)
5 hours per week; 13 weeks/7th semester; 26L/13T/26L; ECTS credits:6

Provide a social and economic framework for understanding the nature and interaction of information, technology, people, and organisational components. Explain how IS can both constrain and enable organisations and explore the relationship between IS and organisational structure. Drawing on Structuration Theory and Institutional Economics the students will be provided with an understanding of the characteristics of the information economy. Consider the role of the Internet and networking technology in modern organisations. The above concepts will be reinforced and developed through the use of web and collaborative software.

MK4005 MARKETING INTELLIGENCE (AUTUMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

Sources and Use of Marketing Intelligence; The Role of Research and Intelligence in the Marketing Organisation; Role of Marketing Information and Composition of Marketing Information Systems; Research for Marketing Decision Making; Approaches to Data Capture – Databases, EDI and Point-of-Sale; Marketing Research in Different Contexts; Research Methods; Commissioning and Evaluating Marketing Research.

MK4007 APPLIED MARKETING 1 (AUTUMN/4)
(3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits:6)

Through the management of an extensive project students will be exposed to and should develop skills in relation to developing research objectives, creating a research design, and assembling a research proposal. Further, students will gain experience in data collection, interpretation and both in terms of primary and secondary sources. Finally, students will be expected to present research findings.

MK4025 MARKETING COMMUNICATIONS (AUTMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

Role of communications; communications theory; audiences; how advertising works; the management of marketing communications; the advertising industry; creative aspects of advertising; media aspects of advertising; ethics and advertising standards; the role of
the media; communication vehicles; integrated marketing communications; the effects and effectiveness of marketing communications.

MK4603 MARKETING (NON-BUSINESS) (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6
Marketing in society; strategic market planning; marketing information systems; new product development; pricing; promotion; channels of distribution; competition analysis; consumer behaviour services marketing; market segmentation, consumer research methods, identifying marketing information requirements; formulating research projects, the scientific method - its characteristics and practices, experimental research designs, attitude measurement, questionnaire design; marketing research applications: product research, advertising research, corporate image research, market testing; ethical issues in marketing research.

MN4007 PROJECT MANAGEMENT THEORY AND PRACTICE (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6
The primary objective of this module is to provide students with the knowledge, skills and understanding necessary to apply Project Management principles, tools and techniques to help initiate change to achieve specific pre-determined project objectives in line with organisational goals and strategies. The module will prepare students for the workplace by developing their understanding of Project Management knowledge areas and Project Management processes. The student will benefit from understanding how projects are Initiated, Implemented, Monitored and Controlled and Closed within a change environment.

PM4013 PRINCIPLES OF HUMAN RESOURCE MANAGEMENT (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6
The syllabus covers core issues surrounding managing people at work. In so doing, the module starts with a consideration of key labour market issues in Ireland and how these affect the nature of HRM in organisations. Arising from a labour market analysis, core HR activities are next explored including the processes of human resource planning, recruitment and selection. The module next examines critical elements of managing and rewarding performance, designing jobs and developing people at work. The nature of work is set down and finally, the regulatory environment for HRM in Ireland is indicated.

PM4017 HUMAN RESOURCE PRACTICE (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6
This purpose of this module is to develop practical skills/capabilities considered essential for HR practitioners. These skills are primarily in the key areas of selection, appraisal, discipline and grievance and applying regulations governing HR to all processes and activities. Another core purpose of the module is to increase the knowledge and skill and overall capability of the participants in key operational areas of HR such as rewards, performance management, health and safety, employment regulation, employee welfare issues, motivation and retention.

PM4027 SOCIAL PSYCHOLOGY OF ORGANISATIONS (AUTUMN/4)
(OFFERED ONLY IN AY2009/10)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6
Approaches to the study of social psychology; Culture, Society, Socialisation and Individual Freedom; The Construction of Attitudes, Values and Ideologies; The Landscape of Organisational Form in the Social World; Beyond Bureaucracy and the Rise of Modern Organisational Hegemony; The Boundaryless Organisation; Organisational Citizenship; Future Directions in the Social Psychology of Organisations.

PM4035 THE PSYCHOLOGY OF WORK (AUTUMN/3)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6
Exploring the reality of work; The meaning of work; Work Orientation; Employment and Unemployment; The psychological contract and the work socialization process; The changing context of work; Workforce Management; Changing Workforce Composition; Career Re-conceptualisation; Work Life Balance and Work Family Conflict.

PM4045 THEORETICAL PERSPECTIVE ON EMPLOYMENT RELATIONS (AUTUMN/3)
2 hours per week; 13 weeks/ 5th semester; 26L; ECTS credits: 6
Collective and individual approaches to studying and managing the employment relationship. The role and function of trade unions and employer organisations in a societal and organisational context. The roles of employment relations actors: full-time officials, shop stewards, line managers, specialist HR functions and supervisors. The role and operation of state institutions. Voluntarism and legalism in Irish employment relations. The role of rules, especially procedure agreements, including the practical operation of discipline and grievance procedures. The practical operation of dismissals and equality legislation in the workplace. Collective

PM4603 EMPLOYEE RELATIONS FOR ENGINEERING/SCIENCE (AUTUMN/2)
2 hours per week; 13 weeks/3rd semester; 26L; ECTS credits: 6

The employment of relationship; the individual and work groups; the basics of recruitment and selection; motivation techniques; effective supervisory and management; industrial relations; communications in employee relations; the role of management and trade unions; line management and shop stewards; labour law; the basics of negotiation; national and local pay bargaining.

PM4067 CONTEMPORARY ISSUES IN ORGANISATIONAL BEHAVIOUR (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

Introduction: Revisiting OB: what it is, what it is not, and how we might alternatively conceptualise it; Dimensionalising the Healthy Organisation; Gender in Organisations, communications, progression, and balance; Diversity in Organisations, perspectives and dilemmas; Emotion in Organisations, nature and consequences; Trust in Organisations, Antecedents, Forms, Conditions and Breaches; Justice in Organisations, Types, Range and Consequences; Organisational Citizenship Behaviour, Individual, situational & affective explanations; Ethics and Ethical Behaviour, Implications for HRM
The Department of Education and Health Sciences (EHS) is an exciting development at the University of Limerick. The Faculty was newly created in January 2008 as part of a substantive academic restructuring at the University. This has resulted in bringing together in a new Faculty a number of related disciplines in the Department of Education and Professional Studies, Department of Physical Education and Sports Sciences, Department of Physiotherapy, Department of Psychology, Department of Nursing and Midwifery, Department of Occupational Therapy, Department of Speech and Language Therapy and the School of Medicine (Graduate Entry). Those interested in post primary teaching as well as those interested in working in the health sector will find some of the most progressive programmes in these applied fields of study in the country. There are opportunities for clinical and educational placements as well as dedicated supervision from faculty members committed to the highest standards of teaching and quality research.
The definitions of curriculum as content and experience as well as hidden curriculum; the philosophical and ideological foundations of curriculum are considered from the perspectives of knowledge, society and the individual; the relationship between curriculum and education policy; external influences on curriculum policy and policymaking; partnership approach; recent curriculum policy developments; core curriculum; the work of the NCCA and their proposals for senior cycle reform; curriculum change, reform, innovation and development; curriculum design; key factors associated with the adoption, implementation, dissemination and evaluation of curriculum reform; impact of school and teacher culture on curriculum reform efforts; case studies of recent curriculum reforms e.g. ICT for teaching and learning; the pedagogy and assessment of the curriculum; purposes, modes and techniques of assessment; assessment for learning; contemporary national and international curriculum issues; some radical alternatives.

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This module supports the development of knowledge, skills, and attitudes which will support student teachers in preparing for their teaching practice placement in semester 4. It introduces them to the importance of good practice when planning and preparing learner-centred, active learning experiences, including the development of learning resources. Students will have the opportunity to implement these plans in a small group setting with young pupils (START Teaching) and to reflect on their own learning from this experience. The module also addresses key issues in relation to the management of the learning environment, assessment for learning, mixed ability teaching and the effective use of ICT to support learning. A strong focus will be placed upon essential child welfare issues, the Teaching Council Code of Professional Conduct and the implications for student teachers. The module also provides the student teacher with an insight into educational provision in modern Ireland.

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Rationale And Purpose Of The Module: Identify and critically analyse influences which shape the individual, with a focus on self-identity with a focus on the role of communication in teaching

Syllabus:
This module explores students own decision making process in relation to choosing this teacher education programme. Personal growth is central to the module and students are encouraged to reflect on understanding of self and self identity.

Students will examine the three domains in communication: theory, skills and dynamics, with a particular focus on the application of the theory and practice of communication to teaching and learning. Students will develop understanding of group processes from a theoretical and personal perspective.

The module will focus on both micro and macro skills in communication and their application to the learning environment. The micro skills will include the use of both verbal and non-verbal behaviour. The macro skills will include the ability to critique and give feedback on the written arguments of others and to present arguments in a clear and logical manner, with appropriate use of referencing to the literature.
NURSING AND MIDWIFERY

NS4013 HEALTH STUDIES

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

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

NS4063 CARE OF THE NEONATE

Rationale And Purpose Of The Module:
To examine the midwife’s role and responsibility in assessment, planning, implementation and evaluation of the care of the neonate

Syllabus:
Adaptations to extrauterine life, thermoregulation, initial steps of neonatal resuscitation, prevention of infection in the neonate, nutritional requirements of the term

NS4071 ADAPTATIONS TO PREGNANCY

Rationale And Purpose Of The Module:
To facilitate students to acquire knowledge and understanding of adaptations to pregnancy and gain an understanding of parenthood from a physiological and psychosocial perspective

Syllabus:
Women’s adaptation to pregnancy and childbirth a psychosocial context
Anatomy and physiology applied to childbirth
Change and adaptations in pregnancy
Confirming pregnancy
Maternal nutrition
Antenatal care and examinations
Assessing fetal well-being

Clinical skills:

Landmarks and diameters of female pelvis and their application to midwifery practice
Landmarks and diameters of the fetal skull and their application to midwifery practice
Use of support mechanisms for successful breast feeding
Fetal assessment and monitoring throughout pregnancy
Examination of the placenta
Abdominal palpation
Initial antenatal visit
Antenatal assessment monitoring and investigations throughout pregnancy

NS4201 BIOLOGICAL STUDIES 1: ANATOMY AND PHYSIOLOGY

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

Syllabus:
Introduction to the body as a whole, tissues, organs, system, and cavities of the body.
Cellular structure, the cell surface, cytoplasm, filtration, and simple diffusion. Tissues: epithelial, connective, muscle and nervous.
The Integumentary System: Histological structure and function of the skin and subcutaneous tissue.
The Skeletal System: Structure and function of the skeleton, the healing of fractures.
Joints: Classification, structure, function.
Muscles: Structure and function.
The Central Nervous System: Meninges, ventricles and cerebrospinal fluid, blood supply and the brain barrier system, structure and function of the spinal cord, the midbrain, the pons varolii and cerebellum, the cerebrum, medulla oblongata, the limbic system.
The Peripheral Nervous System and Reflexes: Classification and anatomy of nerves and nerve fibres, the cranial nerves, the spinal nerves, nerve plexuses, the nature of reflexes, components of a reflex arc.
The Autonomic Nervous System: Anatomy of the sympathetic and parasympathetic division, functions of the autonomic nervous system, the adrenal glands, neurotransmitters and receptors.
NS4203 BIOLOGICAL SCIENCES
3: ANATOMY, PHYSIOLOGY AND PATHOPHYSIOLOGY

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

Syllabus:

NS4213 PRINCIPLES OF NUTRITION NURSING

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

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

Clinical Skills Syllabus:

NS4221 ADULT NURSING CARE

Rationale And Purpose Of The Module:
This module introduces students to the challenges of nursing individuals in the acute hospital setting. The process of assessing/identifying needs, planning, prioritising, delivering and evaluating nursing care will be explored.

The purpose of this module is to facilitate students understanding of the nursing required for the ill adult in both hospital and community settings.

Syllabus:
Nursing care and management of the acutely ill adult: Altered levels of consciousness, pressure area maintenance. Pain: Definitions, dimensions, measurement, strategies to support and care for the individual experiencing pain. Introduction to peri-operative nursing care: Elective and emergency surgery; altered homeostasis, peri-operative complications e.g. anaphylaxis, malignant hyperthermia, hypovolaemic and neurogenic shock. Bio-psycho-social aspects of the nursing care of the ill adult e.g. stress, sleep and sensory deprivation, altered body image, role of the family and carers. Nursing care and management of individuals experiencing altered skin integrity, e.g. wounds, burns, dermatological conditions.

Clinical Skills Syllabus:

NS4321 CONCEPTS AND NATURE OF INTELLECTUAL DISABILITY

Rationale And Purpose Of The Module:
This module introduces the student to the concept of intellectual disability, and a rights based approach to care. The module outlines the contribution of the RNID in caring for people with an intellectual disability.

Syllabus:
Clinical Skills Syllabus:
Principles of hand washing
Assist with bathing/ bed making, promotion and maintenance of elimination, safe positioning of clients.
Assessment and maintenance of skin Integrity

NS4323 NURSING ADOLESCENTS AND ADULTS WITH INTELLECTUAL DISORDER

Rationale And Purpose Of The Module:
The aim of this module is to develop knowledge and skills required to support the person with an intellectual disability through the adolescent and adult stages of life.

Syllabus:

Clinical Skills Syllabus:
Catheterisation, enema/suppository administration and stoma care
Assess living skills

NS4421 THEORETIC BASIS FOR MENTAL HEALTH NURSING

Rationale And Purpose Of The Module:
The aim of the module is to introduce students to mental health nursing and theories underpinning its practice.

Syllabus:
Origins and developments of mental health nursing within the context of contemporary nursing practice. The philosophy, theories, models of nursing. Role of the mental health nurse in a variety of health care settings. Incidence, prevalence, classification, and models of mental health illness. Promotion and maintenance of safety in practice settings.

Clinical Skills
Introduction to skills of engagement
Admission procedures
Introduction to care planning
Handwashing
Assisting and promoting personal care (bathing, elimination, grooming, bedmaking)

NS4423 ALTERED HOMEOSTATIS AND MENTAL HEALTH

Rationale And Purpose Of The Module:
The purpose of this module is to develop Mental Health students’ appreciation of the importance of a holistic approach to patient care and to develop knowledge and understanding of physical illnesses which are common in mental health care.

Syllabus:
The inter-relationship between mental and physical health. Aetiology, signs and symptoms, treatment of physical illnesses in the following systems; circulatory, lymphatic, respiratory, integumentary, digestive, endocrine, reproductive, urinary, auto-immune and central nervous systems, special senses. Nursing care and management of a person experiencing a physical illness. Psycho-physiological responses and somatoform disorders.

Clinical Skills Syllabus:
Catheterisation, catheter care, catheter removal.
Stoma care, enemas, suppositories
Blood glucose monitoring and techniques in insulin administration
Assessment and Maintenance of skin integrity
Oxygen therapy, nebulisers, peak flow measurement and use of inhalers
Breast awareness
Skeletal muscle structure at the tissue and cell level. The process of muscle contraction at the ultrastructural and whole muscle level. The Physiology and energetics of the muscle contraction process and cross bridge cycle. Motor units and muscle fibre types. Functional properties of the different muscle fibre types. Sources and consequences of skeletal muscle fatigue. Muscle training; neural and physiological adaptations to strength and endurance training. Muscle damage and muscle repair. Muscle disease and injury. Treatments for muscle injury and recovery. Prerequisite SS4202

SS4205 NUTRITION, EXERCISE, METABOLISM AND SPORTS PERFORMANCE (AUTUMN/3)
5 hours per week; 13 weeks/5th semester; 26L/26LAB/13T; ECTS credits: 6


SS4217 EXERCISE AND HEALTH 1 (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

This is a module which brings together the knowledge you gained in the last three years to investigate aspects of exercise and health. These include sport performance, lifestyle and general well being. Included in this module are examples of how exercise may be used prospectively to improve the quality of life and also as an adjunct therapy to clinical medicine in the treatment of life-threatening disease.

SS4305 QUANTITATIVE BIOCHEMICAL ANALYSIS (AUTUMN/3)
4 hours per week; 13 weeks/5th semester; 26L/26LAB; ECTS credits: 6

Theoretical Content Overview of measurement techniques in biomechanics. Data smoothing techniques and criteria for their optimisation; residual analysis. Inertial properties of the human (or animal) body. Free body diagram analysis of the human frame. Calculation of angular momentum; local and remote terms and total H. Mechanical properties of biological materials. Introduction to human simulation theory. Practical Content Force plate data capture and subsequent analysis. Advanced data analysis using spreadsheet solutions. Butterworth filter design and optimisation. Introduction to simulation. Prerequisite SS4304

SS4312 QUALITATIVE BIOCHEMICAL ANALYSIS AUTUMN(2)
4 hours per week; 13 weeks/2ndt semester; 26L/26LAB;ECTS credits:6

of rotation, torque and angular impulse, moment of inertia applications to sports situations Motor Development and qualitative kinematic analysis. Prerequisite SS4302

SS4403 COACHING SCIENCE AND PERFORMANCE 2 (AUTUMN/2)
5 hours per week; 13 weeks/2nd semester; 13L/52LAB; ECTS credits:6

Students will be required to select one invasion game from four offered during the semester. The sports offered will be chosen from Soccer, Camogie/Hurling, Gaelic Football, Hockey, and Rugby. In addition to the sports specific content, common elements of pedagogy and applied physical conditioning will be included. Exercise Prescription 3: Classification of sports. Sports needs analysis in terms of physical, technical, tactical and mental demands. Planning the training year - training units, micro, meso and macro cycles. Pedagogy includes: coaches’ decision making, reflective practice, performances, ethics in coaching and the development of ‘expert’ coaches. Physical Conditioning 2: Structure and phases of circuit training, flexibility and advanced resistance training sessions. Safe selection, structuring, adaptations and progressions for appropriate activities. Different types of circuit training sessions, organisation and safety concerns. Devising and implementing programmes. Flexibility development through static stretching (active and passive) isolated and assistive and PNF. Development and demonstration of specific lifting techniques, spotting, progressions for plyometric training, medicine ball work. Weight training to develop speed and power. Advance schedules and systems of training for sports specific and body builders. Prerequisite SS4402

SS4417 HUMAN PERFORMANCE EVALUATION (AUTUMN/4)
4 hours per week; 13 weeks/7th semester; 26L/26LAB; ECTS credits:6

This is a final year integrative module that aims to complement research skills gained in the sport and exercise science final year project with practical skills and experience in sport and exercise evaluation. The course will consist of lectures on the theory and practice of performance evaluation in an integrative format to make the students critically aware of appropriate testing for different populations and the On an individual basis students will prepare a comprehensive piece of written work on effective evaluation processes pertaining to human performance and functioning in the context of sport and health. In a team-based exercise, students will make a seminar presentation on an effective evaluation process for a specific scenario in the sport and health domain. Prerequisites SS4205, SS4305, SS4105

PY4041 PEDAGOGY OF HEALTH RELATED ACTIVITY / AQUATICS (3 credits)

COURSE AIMS & OBJECTIVES To improve students’ understanding and awareness of these activities through considered practice and theoretical inquiry. To make links between Aquatics and Health Related Activity. To indicate how these activities have relevance in contemporary Irish Physical Education.


PY4051 PEDAGOGY OF OUTDOOR ADVENTURE / NET GAMES (3 credits)

(No description available)

PY4038 QUALITATIVE BIOMECHANICS (6 credits)

Rationale And Purpose Of The Module: While a sound knowledge of anatomical structure is a prerequisite for effective analysis of human movement activity - Analysis requires in depth understanding of how forces act on joints and how joint structure affects movement. There is a need for the sport scientist and physical education specialist to develop effective skills qualitatively analysing joint function through a synthesis of knowledge of anatomy and of basic mechanics. There is also a need to encourage the student to focus on the applied nature of anatomy and mechanics in sport. An emphasis on applied nature of this knowledge to sports performance will be achieved through extensive practice in the application of deterministic models of performance, and examination of overall performance objectives, biomechanical factor and principles and critical features of performance in a wide range of sport and exercise activities. This module builds directly on the material of SS4302, the basic physics module. Prerequisite Modules: PY4022

Faculty of Education and Health Sciences

PHYSICAL EDUCATION AND HEALTH SCIENCE
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<tr>
<th>Course Code</th>
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<tr>
<td>PY4083</td>
<td>PEDAGOGY OF STRIKING &amp; FIELDING / ATHLETICS</td>
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<td>PY4073</td>
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<td>PY4048</td>
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<td>PY4055</td>
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<td>SS4401</td>
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<td>SS4128</td>
<td>APPLIED SPORT PSYCHOLOGY</td>
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**Rationale And Purpose Of The Module:**
This module introduces socialisation into and through physical education and the role of the physical educator. Students are encouraged to reflect on their own socialisation into the role of physical education student and how this impacts on their understanding of physical education. This module also focuses on issues of social development (e.g. gender, social class, disability and racism). These topics are examined in light of how they have affected and are currently affecting the teaching of school physical education.

**Syllabus:**
Sports: Students will be required to select one individual/dual sport from three offered during the semester. The sports offered will be chosen from track & field athletics, swimming and tennis. In addition to sport specific content (skills and tactics), common elements of pedagogy and applied physical conditioning will be included.

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

Exercise Prescription 1: Introduction to health related fitness (HRF). Introduction to and personal experience of field tests for HRF; introduction to principles of training; warm-up and cool-down procedures; health appraisals and screening.

**Prerequisite Modules:** PY4401, PY4601
**Syllabus:**
Content relating to performance enhancement includes psychological characteristics of peak performance, characteristics of elite athletes and their development, increasing of awareness; selected mental skills and strategies (e.g. muscle relaxation, autogenic training, meditation, self talk, plans & routines, simulation training); guidelines and procedures for implementing intervention strategies; conducting mental skills training programmes. Attention will also be given to the environment in which sport occurs focusing on aspects of group dynamics.

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**PY4001 HUMAN ANATOMY 1**

**Rationale And Purpose Of The Module:**
To provide students with an understanding of Comprehensive knowledge and understanding of general structural and functional organisation of the human body. To enable students to understand the structure and function of musculo-skeletal framework of the upper extremity. Functional relevance of all anatomical structures is emphasised to enable students to appreciate the interrelationships of structure to function. An understanding of application of core anatomical knowledge to clinical conditions is developed through problem-integrated learning.

**Syllabus:**
Introduction & usage of anatomical terminology; Introduction to general anatomy of the musculoskeletal system; Classification of bones, joints and muscles; Introduction to the regional anatomy; Structural, functional & applied Anatomy of the upper limb; Detailed structure and function (to include bones, articular surfaces, joint stability, support, plane and range of motion, factors affecting range of motion; synovial membrane, ligaments, blood and nerve supply, lymphatic drainage, and muscle attachments) of the shoulder girdle, shoulder joint, elbow joint, radio-ulnar joints, wrist, hand and finger joints; Analysis of basic functional activities involving upper limb; Introduction to peripheral nerves [causes & consequences of injuries to upper limb nerves ]; Introduction to injury and repair [fractures & healing]; Introduction to development of limbs / developmental defects.
**SN4201 – SOCIAL SCIENCES 1, INTRODUCTION TO PSYCHOLOGY**

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6

Overview of emotional, cognitive, and social development.

Development of intelligence. Psychology of health beliefs, experience, and behaviour. Social psychology: in particular, the concepts of attitude development, interpersonal and group relationships, and communication. Introduction to the main categories of abnormal behaviour, including their aetiology and treatment.

**PS4021 PSYCHOLOGY: THEORY AND METHOD 1 (AUTUMN/1)**

2 hours per week; 2 tutorial meetings; 13 weeks/2nd semester; 26L/4T; ECTS credits: 6

The aim of this module is to provide students with a broad introduction to the historical evolution, issues, debates, themes and theories in psychology. The course will provide a good grounding in a range of theoretical perspectives in psychology. This module is the first of two modules which provide a broad introduction to the discipline of psychology. This module will begin with a brief historical and philosophical overview of the roots of psychology and then move on to cover the psychodynamic perspective, behaviourism and learning theory, the biological basis of behaviour, and cognitive psychology. Within the biological perspective the focus will be on motivation and emotion, and within cognitive psychology the focus will be on memory. Assessment includes a final exam (2 hours, 2 essay questions), accounting for 70% of the final grade, and 2 written reports reviewing a book or an article, accounting for 15% each.

**PS4011 SOCIAL PSYCHOLOGY 1 (AUTUMN/2)**

Social psychology is a field of psychology that considers the nature, causes, and consequences of human social behavior. The module will cover theories, models, key concepts and issues related to attitudes and behaviour, social influence, intra and inter group processes, pro-social behaviour, and affiliation, attraction and love.

**PS4022 PSYCHOLOGY OF PERSONALITY (AUTUMN/2)**

2 hours per week; 13 weeks/3rd semester; 26L; ECTS credits: 6

For students to understand how the field of psychology has approached the topic of personality. For students to develop knowledge of the ways personality and individual difference, intelligence and aptitude are constructed and tested in psychology. Personality is a collection of emotion, thought and behaviour patterns that are unique to an individual. Through a series of lectures and practical tutorial sessions, topics relevant to the psychology of personality will be explored; including defining personality, temperament, aptitude and difference; personality and intelligence testing; and models including factorial models, typologies and circumplexes.

**PS4027 APPLIED PSYCHOLOGY (AUTUMN/4)**

2 hours per week; 13 weeks/7th semester; 26L; ECTS credits: 6

This module examines how major theories and core areas of psychology can be applied in professional practice. Students will be introduced to key area of psychological practice such as clinical psychology, occupational psychology, ergonomics, artificial intelligence and health psychology. For students to develop an understanding of the way psychology is applied in practice and to introduce students to the range of areas in which professional psychologists work and practice in community, educational, health care and business settings. The assessment for this module consists of 25% coursework and 75% a final exam. The coursework is a CV/cover letter assignment and the exam includes two essay questions.

**PS4031 PSYCHOLOGY AND EVERYDAY LIFE (AUTUMN/1)**

2 hours per week; 13 weeks/1st semester; 13L/13T; ECTS credits: 6

This module will introduce students to a range of fundamental theoretical perspectives and issues in general psychology through examining their relevance in everyday life. Through exploring everyday issues students will not only learn about theoretical perspectives but will also gain a basic knowledge of how psychology may be applied. In addition, through exploring some key studies in psychology, students will gain a basic understanding of the main investigative techniques used by psychologists. The range of topics will include; definitions of psychology; attachment; sleep, eating, aggression and biological basis of behaviour. Assessment consists of coursework (25%) and a final exam (75%). The coursework is a paper on students’ experience in a psychological study and the final exam contains multiple choice questions.

Numbers are limited on PS4031. The module is subject to availability on arrival at the University of Limerick.

Numbers are limited on PS4031. The module is subject to availability on arrival at the University of Limerick.
**PS4035 BIOLOGICAL BASIS OF HUMAN BEHAVIOUR (AUTUMN/2)**

2 hours per week; 13 weeks; 3rd semester; 26L; ECTS credits: 6

Students will learn about the role of the brain and the central nervous system in human behaviour. This module addresses the structure and function of the mammalian nervous system with an emphasis on specialized topics, including the biological bases of the chemical senses, sleep and dreaming, learning and memory, emotions, sexual behaviour, stress, and psychiatric disorders. Coursework: You will be assessed with two writing assignments. For each paper select one of two topics offered, and write an essay on that topic between 2000 and 2500 words. Each essay is worth 50% of your grade: The average of both papers will be your final grade.

**PS4041 PRACTICAL PSYCHOLOGY (AUTUMN/1)**

2 hours per week; 13 weeks/1st semester; 26LAB; ECTS credits: 6

To introduce students to the range of research methods employed in psychology. To develop student’s ability to work with quantitative data and SPSS in particular. On completion of this module students should be able to: demonstrate knowledge of the basic research methodologies in psychology and in particular case studies and observational methods. Understand how to code and analyse basic descriptive information. This practical class introduces the range of methods employed in psychology to students. The value of experiments, observational, survey and interviews and case studies work are considered using illustrative examples. Practical skills in these methods are developed through the use of selected examples. Students are also introduced to important IT skills such as library search skills and SPSS for coding of data via practical work. Evaluation is based on two pieces of lab-reports, each accounting for 50% of the final grade.

**PS4043 EMPIRICAL PSYCHOLOGY I (AUTUMN/2)**

2 hours per week; 13 weeks; 3rd semester; 26T; ECTS credits: 6

Classical approaches to psychology emphasise the importance of the experimental paradigm to understanding behaviour and mental processes. This lab based module introduces students to the traditional experimental approach and familiarises them with concepts such as randomisation, experimenter bias, confounding variables via a series of practicals. Issues such as correlation and causation are discussed and the necessity of quasi experimental approaches highlighted. Students learn to design, conduct, code and analyse experimental data whilst paying due consideration to the welfare of participants and attending to the appropriate ethical guidelines. The main goal of the course is to introduce students to a range of laboratory based activities in psychology and to develop students ability to design, collect, code and analyse empirical data using experimental methodologies. Evaluation is based on two pieces of lab-reports, each accounting for 50% of the final grade.

**PS4087 POLITICAL PSYCHOLOGY (AUTUMN)**

Rationale And Purpose Of The Module: To extend students knowledge of psychology into the area of political psychology and to improve students understanding of the role that social and political structures can have on human behaviour

**PS4047 ABNORMAL AND CLINICAL PSYCHOLOGY (AUTUMN)**

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

**Syllabus:**

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

For students whose talents and interests lie in subjects such as languages, history, sociology, cultural studies, music, politics and law this Faculty is an excellent choice. The Faculty of Arts, Humanities and Social Sciences is a vibrant centre of critical thought and a generator of national and international scholarship. It prides itself on the quality of its teaching and its commitment to research within a context where debate and discussion are an integral part of developing those analytical skills which are much sought after in the workplace. The research objective of the Faculty is to create a vibrant centre of critical thinking and to be a generator of national and international scholarship. It strives to facilitate postgraduate and post doctoral students to undertake research, and encourages them to be actively involved in the dissemination of their work.
Civil liability: negligence; statutory duties and remedies; economic torts: inducement to breach of contract; conspiracy; passing off; deceit and injurious falsehood.

LA4013 – MEDIA LAW
3 hours per week; 13 weeks/3rd semester; 26L/13T; credits 6

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

LA4022 COMMERICAL LAW
To familiarise the student with the legal background of commercial transactions.

LA4033 LAW OF THE EUROPEAN UNION 1
Rationale And Purpose Of The Module:
The aim of the module is to equip the student with an understanding and knowledge of the basic principles and rules of the European Union, including: the origins and character of European Union law, beginning with the three original Community Treaties, developments from the 1960s up to the Lisbon Treaty. Each of the Institutions will be examined: Parliament, Commission, Council, European Council, Court of Auditors, European Central Bank and the Court system. Sources of law: Primary (Treaties), Secondary (Regulations, Directives etc), Case law of the Court of Justice of the European Union. Enforcement of EU law-Infringement proceedings (Article 258), proceedings for failure to act (Article 265), proceedings for failure to fulfil an obligation (Article 259); Preliminary references-Article 267; Legislative process-role of the institutions, Relationship between EU Law and national law-Supremacy and Direct Effect; Development of Human rights and the effect of EC/EU membership on Ireland.

LA4035 LABOUR LAW (AUTUMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; credits 6

Nature of labour law; protective legislation and conditions of employment; termination of employment; trade unions; courts and tribunals in labour law.

LA4068 CRIME AND CRIMINAL JUSTICE
Rationale And Purpose Of The Module:
The Crime and Criminal Justice module aims to critically evaluate the institutions and operation of the criminal Irish justice system in comparative perspective. The module aims to introduce students to the main approaches and theories in the field of crime and criminal justice studies, and the mechanisms by which the criminal justice system responds to the incidence of crime. The module also examines the influence of the media influence on public attitudes towards crime, criminal justice processes and sentencing, criminal justice policy making, reform and anti-crime initiatives.
Syllabus:
Historical development of the criminal justice system. Models of criminal justice: due process versus crime control. Criminal justice values and policies. Human rights and the criminal justice system. The making of criminal justice policy: the Department of Justice, Equality and Law Reform; the National Crime Council; the Law Reform Commission; the role of Non-governmental Bodies. The influence of European institutions on the Irish criminal justice process. Influence of the media on the criminal justice process and policy implementation. Diversion from the criminal justice system including Garda cautions and prosecutorial discretion. Alternative processes in the criminal justice system: restorative justice; the Drugs Court. The juvenile justice system. Penal policy and rationales for sentencing. Sentence management and the treatment of offenders; conditions of imprisonment; scrutiny of the prison system including judicial review and visiting committees; the Inspector of Prisons and Place of Detention. The adoption of civil mechanisms in the criminal justice system: seizure of criminal assets and other proceeds of crime; anti-social behaviour orders.

LA4111 CONTRACT LAW 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6
Formation of contracts: offer and acceptance; intention; doctrine of consideration; formal and evidentiary requirements: void, voidable and unenforceable contracts; construction/interpretation of contracts: intention; parole evidence; express and implied terms; public interest restrictions on contractual freedom: capacity; illegality; privy; competition policy; doctrine of restraint of trade; consumer protection.

LA4205 NURSING AND MIDWIFERY AND THE LAW
Rationale And Purpose Of The Module: This module provides an understanding of the role and application of the legal process in the practice of nursing.
Syllabus:
• The sources of law: the Constitution, case law, and legislation.
• The court structure; tribunals and other dispute resolution mechanisms
• The regulatory framework: The Nurses Act and An Bord Altranais, registration, and control on the right to practice, proposed Nurses and Midwives Act
• Record keeping and confidentiality
• Data Protection legislation, freedom of information legislation
• The midwifery and nursing environment - hospitals, community, nursing homes; health and safety provisions
• Charter of Patients rights
• Disciplinary issues: fitness to practice, investigation, and sanction

LA4211 CRIMINAL LAW 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6
Historical and ethical consideration of criminal law; characteristics of a crime; parties to a crime: principals and accessories; vicarious liability; elements of a crime; actus reus; conduct; omissions; status; mens rea: intention; recklessness; criminal negligence; men in penal statutes; offences of strict liability; general defences: infancy; insanity; automatism; intoxication; mistake; necessity; duress; self defence; inchoate offences: attempt; incitement; conspiracy.

LA4300 LAW OF TORTS 1B
To evaluate critically the role of the law of torts in society, to examine the basic elements of a tort with particular emphasis on negligence and the defences thereto.

LA4610 LAND LAW 1 (AUTUMN/3)
3 hours per week; 13 weeks/3rd Semester; 26L/13T; ECTS credits: 6
The nature of land law and its historical evolution, the concept of estates and tenure; freehold estates; fee farm grants; fee simples; fee tails; life estates; pyramid titles; future interests; incorporeal hereditaments; co-ownership; lesser interests in real property including licences and covenants; registration of interests in real property; extinguishment of interests; adverse possession; merger.

LA4810 EQUITY AND TRUSTS 1 (AUTUMN/3)
3 hours per week; 13 weeks; 26L/13T; ECTS credits: 6
The nature of Equity, priorities, registration and notice, mortgages; equitable doctrines, conversion, election, satisfaction and ademption, performance, donations mortis causa; equitable remedies, the injunction, specific performance, recession, rectification, declaration and tracing.
LA4901  PRINCIPLES OF LAW  
(AUTUMN/1)  
3 hours per week; 13 weeks/1st semester;  
26L/13T; ECTS credits: 6

The concept of law, common law and equity, historical development, precedent and legal reasoning, the civil law system in Europe, Community Law; sources of Law, the 1937 Constitution, the European Treaties, statutes, case law, custom; the Administration of Justice in Ireland, court structure and jurisdiction, legal and equitable remedies; role of law in the business environment, its function and methods, legal philosophy in business law, substantive issues of law: constitutional law; property law; law of torts; criminal law; business ethics and the law.
POLITICS & PUBLIC ADMINISTRATION

**PA4012 PARAGOVERNMENTAL ORGANISATIONS (AUTUMN/1)**
3 hours per week; 13 weeks/1st Semester; 39L; ECTS credits:6

Para-governmental organisations (state-sponsored bodies) in the Irish public service; commercial and non-commercial agencies; legal, structural and financial characteristics of state-sponsored bodies; the structure of accountability; ministers, management and the houses of the Oireachtas; the rationale for and impact of state enterprise in Ireland; efficiency and performance appraisal in state enterprise; privatisation; para-governmental organisations in comparative perspective.

**PA4021 IDEAS AND CONCEPTS IN PUBLIC ADMINISTRATION (AUTUMN/1)**
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6


**PO4011 INTRODUCTION TO GOVERNMENT AND POLITICS (AUTUMN/1)**
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits:6

Introduction to basic institutions of government, including the constitution, the legislature, the executive, the judicial system, the civil service, pressure groups and political parties; examination of patterns of government in contemporary democratic and non-democratic systems and of the political ideologies that sustain them; evaluation of the main approaches to political analysis.

**PO4018 INTERNATIONAL RELATION (AUTUMN/1)**
3 hours per week; 13 weeks/7th Semester; 26L/13T; ECTS credits:6

International relations at the macro-level; cyclical and linear theories; utopianism versus realism; systems theory; international organisation, interdependence and regime theory economic theories; Marxism, imperialism and neo-colonialism; and world society models; foreign policy analysis; decision-making models; the role of personality, beliefs and perceptions; culture; political regimes; and state-society relations.

**PO4023 COMPARATIVE EUROPEAN POLITICS (AUTUMN/2)**
3 hours per week; 13 weeks/3rd Semester; 26L/13T; ECTS credits:6

Introduction to comparative European politics; provides a basic understanding of the organisation of European governmental systems; the role of political parties; party families; voting behaviour; majoritarian and consensual Democracies; the politics of individual European states.

**PO4027 INTERNATIONAL ORGANISATIONS & GLOBAL GOVERNANCE (AUTUMN/4)**
3 hours per week; 13 weeks/7th Semester; 26L/13T; ECTS credits:6

The origins of international organisations and their place in liberal internationalist thought; the successes and failures of the league of nations system; the united nations system and its internal processes; regional organisations; non-governmental organisations and global governance; international organisations and the search for political and military security; functional-technical co-operation a the regional and global level; global governance and the post-cold war global political economy.

**PO4033 POLITICAL THEORY**

This module will cover the basic concepts in contemporary political theory, building on the ideas introduced in PO4022 Modern European Political Thought. The goal is to develop a clear understanding and mastery of the main concepts and ideas in political theory.
PO4043 INTRODUCTION TO IRISH POLITICS

This course is designed to build on and develop the knowledge gained in earlier politics modules by examining the politics and society of a single country in more depth. The course will apply a range of alternative analytical perspectives from political science and the sub-disciplines of political economy, political sociology, public administration and public policy, to the study of the government and politics of Ireland.

PO4067 STUDIES IN POLITICAL THOUGHT

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

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

PO4107 NATIONALISM, ETHNICITY AND CONFLICT

Rationale And Purpose Of The Module:
In this module students will address debates about the causes and nature of nationalist politics and ethnic conflicts. They will explore the ways in which historians and political scientists have sought to explain the capacity for national movements and ethnic identities to mobilise and unite people who may among themselves have sharply contrasting objective interests. A key aim of this module is to enable you to take general theories in this case those that explain nationalism and ethnicities and to use them critically, testing their validity, and if necessary, introducing your own modifications and qualifications to these theoretical generalizations.

Syllabus:
Introductory: What is a nation?
Nations, nationalism and modernity.
Pre-modern nations.
Case study: Irish nationalism
Case Study: South Africa: Afrikaner and African nationalism
Case Study: Slovak Nationalism
Ethnicity and ethnic conflicts: An introduction
Ethno-nationalist movements and political violence
Ethnic conflicts and peace processes
Gender, nationalism and ethnic conflicts
Case studies: Sri Lanka, Kashmir
Case Studies: Northern Ireland, Former Yugoslavia
The Scope of Sociology; locating yourself sociologically; culture and identity - sociological versus personal explanations; four sociological perspectives: conflict, functionalist, interactionist and feminist perspectives introduced; what do sociologists do? an exploration of the key research methods used by sociologists in their analysis of society; doing sociology: an examination of power and control in society; a consideration of social structure in terms of gender, race and class; sociological consideration of social structure in terms of gender race an class; sociological understandings of social change, social exclusion, work and non-work, religion and the media; sociological accounts of the state; crime, health and education.

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

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

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

The course will introduce theories of social change and perspectives on work as well as examining contemporary changes in work practice. The effects of class, gender and ethnicity on access to and experience of work will be examined. The changing organizational context of work will be explored. Other themes include sectoral decline, development and relocation as well as an examination of globalization and the rise of the transnational corporation. The continuance of hierarchical and vertical segregation in the midst of organisational, societal and cultural change will be explored, as well as organisational culture. A number of Irish case studies will be examined e.g those related to the semi-state and educational sectors. The course concludes with a consideration of the future direction of socioeconomic change and
its impact on the distribution, structuring and experience of work.

SO4073 CLASSIC SOCIOLOGICAL THEORY
ECTS credits: 6

The module begins by outlining the socio-historical transformations (industrialisation, urbanisation, expansion of capitalism) that gave rise to classic social theory. Key thinkers, who sought to make sense of modernity and ‘the problem of social realt’, are then discussed; such as: Marx, Durkheim, Weber, Simmel, Mead and Schutz. Discussion will focus on their different analyses of, among other things: the development of capitalism and the money economy; the division of labour; social solidarity; class conflict and ideology; rationalisation; religious life; the structures of the life-world; the dynamics of symbolic interactions and the self. The module considers analyses of historically unfolding macro-social structures, meso-social formations (e.g. bureaucratic organisation) and the vicissitudes of everyday life. The import of classic social theory to the discipline of sociology - including its aims, scope and analyses of modernity is a theme that runs through the module.
IRELAND'S WORLD ACADEMY

Please note that the modules marked with * are subject to audition.

MD4087 ADVANCED ENSEMBLE (6 CREDITS)*

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

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

MU5061 ARTS IN HEALTH

Rationale And Purpose Of The Module:
The aim of this module is for students to discover and learn about the history and contemporary practices of Arts in Health. As objectives, students will have the opportunity to develop knowledge of the contemporary application of creative arts therapies in healthcare including drama therapy, art therapy, music therapy, and dance therapy, and arts applications in healing through history and the use of arts in healthcare contexts.

Syllabus:
Students will develop their knowledge of a range of arts practices in health care so as to be able to discuss, describe and critically reflect on the ways theorists and researchers have considered social, behavioural and therapeutic aspects of these art forms in relation to individual experience and the context of use of the arts in a range of healthcare settings.

MD4097 COMPOSITION AND ARRANGEMENT IN IRISH TRADITIONAL MUSIC 1*

Rationale And Purpose Of The Module:
To develop the students skills and knowledge of composition and arrangement in the idiom of Irish traditional music as it is performed contemporarily.

Syllabus:
Students will examine the various ensemble practices in Irish traditional music in currency today. These practices will include traditional as well as more contemporary and fusion based styles of composition and arrangement. This examination will engage ethnomusicological issues of origin and creation as well as practices of record, transcription and reproduction. Students will also develop and synthesize their own arrangement and composition practices from those studied. Students will be provided with written feedback according to BA Irish Music and Dance policy.

MD4031 CONTEXTUALISING AND VOCATIONAL STUDIES 1

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

Syllabus:
In the first part of this module students will study the music and dance in the context of ‘world music’ with a specific focus on England, Scandinavia, Scotland, Brittany, Galicia, North America, North Indian Classical traditions, and Indonesia. This part of the module will be assessed through course-work and exam. In the second part of the module students will engage in a self-directed project relating to the application of vocational aspects of performance that have been addressed through the course (education, community music / dance, technology, business). The assessment of this will be decided by the course director or relevant members of staff and be appropriate and individual to the project chosen, subject to approval by the student.

MD4083 ETHNOMUSICOLOGY AND ETHNOCHOREOLOGY THEORY AND PRACTICE

(No description available)
**MD4021 INTRODUCTION TO IRISH TRADITIONAL MUSIC AND DANCE STUDIES 1**

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

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

**MD4022 INTRODUCTION TO IRISH TRADITIONAL MUSIC AND DANCE STUDIES 2**

**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.

**MU4135 IRISH TRADITIONAL MUSIC 1**

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

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

**MD4127 MOVEMENTS AND SOUNDS OF NORTH AMERICAN PERCUSSIVE DANCE AND MUSIC TRADITIONS**

(No description available)

**MD4041 PERFORMANCE STUDIES 1: AN INTRODUCTION**

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

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

**MD4043 PERFORMANCE STUDIES 3: INTRODUCTION TO RITUAL STUDIES**

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

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

**MD4001 PRACTICUM 1A**

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

**Syllabus:**
This module is divided into two parts. The first is the development of the students' performance practice will occur in the stylistic context most common to the performance practice of the student. However tutors will begin to encourage students to look to other styles and repertoires current within a primarily Irish context. This will take place in the context of one-on-one classes and develops from the progress in Practicum 1a and 2a.

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

MD4013 PRACTICUM 3B – SECONDARY PERFORMANCE INTEREST*

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

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

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

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

MD4007 PRACTICUM 6A – MAIN PERFORMANCE INTEREST*

Rationale And Purpose Of The Module:
The development of a final extensive performance.

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

MD4017 PRACTICUM 6B*

Rationale And Purpose Of The Module:
The development of final extensive performance representative of performance fields studied but not central to the students performance practice.

Syllabus:
In this module students, with relevant tutors and under the direction of course directors, will prepare and undertake a performance representative of the three areas of performance skills represented in the second performance stream - those not central to their performance practice. This performance will be at the end of the linked module in the next semester.
MD4073 REPERTOIRE, IMPROVISATION AND COMPOSITION 3*

**Rationale And Purpose Of The Module:**
To provide students with the opportunity to study and practice voice and dance composition so that they can develop the skills and confidence to work towards the creation of voice and dance compositions in a range of contexts, which will broaden their career options in performance.

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

MD4077 REPERTOIRE, IMPROVISATION AND COMPOSITION 5*

**Rationale And Purpose Of The Module:**
To support students to develop the understanding of the artistic and technical requirements necessary to develop and produce performances in a range of contexts and broaden their understanding of how to produce work as creative artists and performers in professional performances projects.

**Syllabus:**
Students will be required to specialise in voice or dance, and will work under the direction of guest tutors and the course directors to design and produce a number of performance projects to be presented in a range of performance contexts, featuring the student's own work in addition to the works from the repertories they have studied; the performances will include solo and ensemble works.

MU5601 REPERTOIRE, STYLE AND CONTEXTUALISED PERFORMANCE 1*

**Rationale And Purpose Of The Module:**
To familiarise the student with the diversity of the repertoires of Irish traditional music through the examination of manuscript, printed, audio and visual sources; to enable the to gain a greater understanding of the intricacies of performance through stylistic analysis; to equip the student with the vocational skills necessary for life as a professional musician.

**Syllabus:**
In this module students will examine and interpret the sources of Irish traditional music to enhance both their repertoire and understanding of this tradition. They will also develop skills necessary for musical analysis with the aim of developing their own musicality. The students will study relevant aspects of the music business and music technology which will equip them with the relevant expertise for a professional career.

MD4051 SOMATICS AND RITUAL PERFORMANCE 1*

**Rationale And Purpose Of The Module:**
This module will provide each student with the opportunity to develop skills to research and develop an informed and intelligent approach to own specific technical needs so they can develop healthy and sustainable practices in preparation for performance. It will also encourage them to develop skills to explore new models for ritualising performance, which will increase their options for engagement in a range of professional practices.

**Syllabus:**
An introduction to the history of contemporary somatic practices and their various application in arts practice with particular reference to performance, educational, and therapeutic contexts, with particular reference to the somatic practice of Body Mind Centering, in addition students will study historical, cultural and social aspects of ritual practice with specific reference to performance rituals.

MD4053 SOMATICS AND RITUAL PERFORMANCE 3
(As above)

MD4057 SOMATICS AND RITUAL PERFORMANCE 5
(As above)

MD4107 VOCAL HYGIENE AND PEDAGOGY

**Rationale And Purpose Of The Module:**
This module will develop the students' knowledge of the anatomical, functional, and psycho-social aspects of the singing voice. It is encouraged for all singers on the BA Irish Music and Dance but is open to all students as an elective.

**Syllabus:**
This course will serve as an continuation course to the anatomical, functional, and psycho-social aspects of the singing voice. Intended for singers and non-singers alike, this course will give the student an understanding of the mechanism and function of the components of the singing instrument. With an emphasis on healthy, non-damaging vocal use across all styles of music, the course will cover important aspects of vocal health and hygiene as well as noting the social use of the voice in music and speech.

Students will receive verbal feedback on their
progress on a weekly basis and also written feedback after the final exam. A reflective practice (i.e. self-observation) journal will also be part of the coursework, and as part of the assessment will gauge students' understanding of sources, concepts, as well as provide important observations to assist students own progress.

MD4061 VOICE AND DANCE SKILLS FOR PERFORMANCE 1*

Rationale And Purpose Of The Module:
To provide the opportunity for students to study a broad range of movement and voice techniques in order to develop good understanding and foundation for their practice. The development of a broad base of performance skills will empower the students in professional performance based contexts.

Syllabus:
Students will be required to specialise in voice or dance, and will study and practice a range of different techniques and methods designed to provide them with a strong foundation on which to develop their technical ability in both dance and voice focus on contemporary dance and voice technique training and including dance techniques and practices from Irish, Asian and African traditions, as well as ear training, sight reading/singing and oral transmission learning to complement the technique of voice production.

MD4063 VOICE AND DANCE SKILLS FOR PERFORMANCE 3*

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

Syllabus:
Students will be required to specialise in voice or dance, and through regular technique classes and workshops they will continue to study and practice the basic technical principles underpinning both western and world dance and voice traditions; they will also study movement and voice analysis to increase their understanding of these practices.

MD4067 VOICE AND DANCE SKILLS FOR PERFORMANCE 5*

Rationale And Purpose Of The Module:
The ability to select and design a programme which shows an understanding of technique principles and practices and their application to a specific context will prepare student to develop an informed and intelligent method to sustain their on-going and evolving practice. This will support students to develop a sustainable practice in professional performance based contexts.

Syllabus:
Students will be required to specialise in voice or dance, and through regular technique classes and workshops they will continue to study and practice the basic technical principles of both western and world dance and voice traditions and to further study methods of analysing movement and sound and methods of reflective practice in order to develop critical awareness of technique training; they will also complement the reading/singing skills through the learning of musical analytical and early notational systems; also, each student will be required to design a technique-training programme to reflect their own specific technical needs and interests.
Please note that the modules marked with * are subject to certain standards of fluency.

FR4921 FRENCH FOR BUSINESS 1A

Rationale And Purpose Of The Module:
(i) To introduce students to Business French relevant to their future professional needs,
(ii) to provide students with an understanding of key aspects of contemporary French society,
(iii) to enable students to develop practical skills (receptive and active),
(iv) to consolidate students knowledge of French vocabulary and grammar.

FR4923 FRENCH FOR BUSINESS 3A

Rationale And Purpose Of The Module:
(i) To deepen students awareness of key aspects of the contemporary French world of business;
(ii) to provide students with an understanding of key aspects of contemporary French and Francophone societies;
(iii) to further develop practical language skills (receptive and active);
(iv) to promote students critical reading of French literature;
(v) to build on the grammatical skills acquired in year 1.

FR4925 FRENCH FOR BUSINESS 5A

Rationale And Purpose Of The Module:
To prepare students for study or work placement abroad taking place in semester 6. This is achieved:
by developing students’ knowledge of French for Specific Purposes
by focusing on cultural aspects which will be encountered in and outside the workplace
while residing in the target country
by encouraging team-work and intercultural understanding via tandem learning with French speaking students.

FR4927 FRENCH FOR BUSINESS 7A

Rationale And Purpose Of The Module:
While building on previously acquired reading, speaking, writing and listening skills, the course aims to enhance students’ ability to engage with and express effectively ideas and concepts through the means of the target language
-by analysing primary sources relating to institutions and policies of the EU and the place and role of France within Europe
-by giving students opportunities to practice their oral and written skills (e.g. video-viewing tasks)
-by encouraging team-work and intercultural understanding via collaborative learning with Erasmus students.

FR4141 FRENCH LANGUAGE AND SOCIETY 1 – INTRODUCTION TO FRENCH STUDIES 1

Rationale And Purpose Of The Module:
(i) To present key issues in contemporary French society;
(ii) to enable students to develop receptive and active language skills;
(iii) to review French grammar;
(iv) to examine developments in the French language;
(v) to introduce students to the study of French literature.

FR4143 FRENCH LANGUAGE AND SOCIETY 3 - EDUCATION AND WORK

Rationale And Purpose Of The Module:
(i) To increase students awareness of key issues in French business;
(ii) to develop students linguistic knowledge of business communication in French;
(iii) to build on students practical language skills acquired in first year;
(iv) to further students understanding of advanced French syntax;
(v) to extend students reading and analytical skills in the study of French literature and film.

FR4147 FRENCH LANGUAGE AND SOCIETY 5 FRANCE AND EUROPE

Rationale And Purpose Of The Module:
This module is an introduction to contemporary social, economic and political life in France in a European and global perspective. This is achieved: by developing students’ knowledge of French culture and society by focusing on the country’s cultural, social and political aspects by encouraging team-work and intercultural understanding, by focussing on key moments in the history of France in European affairs and that of France with the francophone communities, language varieties in France and the francophone countries.

FR4241 FRENCH LANGUAGE, CULTURE AND SOCIETY 1

Rationale And Purpose Of The Module:
(i) To provide students with an introduction to major aspects of contemporary French society and culture;
(ii) to familiarise students to issues related to the evolution of the French language;
(iii) to introduce students to the study of French literature;
(iv) to give a solid grounding to a number of points of French Grammar.
(v) to enable students to develop practical language skills (oral and written).
(i) To deepen students' awareness of major developments and issues in business in contemporary France;
(ii) to provide students with the language skills needed to communicate and work in a French business context;
(iii) to extend students' reading and analytical skills in the study of French literature;
(iv) to further students' understanding of advanced French syntax;
(v) to build on students' practical language skills acquired in first year.

FR4247 FRENCH LANGUAGE, CULTURE AND SOCIETY 5

Rationale And Purpose Of The Module:
This module aims:
(i) to enable students to develop their written and oral language skills; (ii) to provide a detailed study of aspects of France in a European and global perspective; (iii) to provide an understanding of the postcolonial cultural context through a study of selected literary texts; (iv) to provide practice in translation in the context of theoretical issues in Translation Studies.

FR4627 FRENCH LITERATURE AND CULTURE 5 – INTELLECTUAL MOVEMENTS

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

SP4007 MODERN TRENDS IN HISPANIC CULTURE AND THE ARTS

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

SP4147 SPAIN, EUROPE AND BEYOND

Rationale And Purpose Of The Module:
By the end of this module students should have:
1. developed further their command of Spanish, by focusing on oral, aural, reading and writing skills.
2. a greater analytical awareness of linguistic issues, developed in particular through translation and critical text analysis activities.
3. a deeper critical understanding of contemporary society, in particular as a result of study of contemporary literature and other text types.
4. the ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.
SP4131 SPANISH FOR BEGINNERS 1

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.

SP4133 SPANISH FOR BEGINNERS 3

Rationale And Purpose Of The Module:
Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive.
Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio-cultural/political issues of contemporary Spain and Latin America.

SP4141 SPANISH LANGUAGE AND SOCIETY 1

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.

SP4143 SPANISH LANGUAGE AND SOCIETY 3

Rationale And Purpose Of The Module:
Second year aims to build on and develop the skills introduced in the first year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents and develop further strategies for autonomous language learning.

SP4231 SPANISH LANGUAGE CULTURE AND SOCIETY 1 (BEGINNERS)

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.

SP4233 SPANISH LANGUAGE CULTURE AND SOCIETY 3 (BEGINNERS)

Rationale And Purpose Of The Module:
Consolidation of the structures, functions and vocabulary taught in the first year and expands grammatical competence to include use of the subjunctive.
Development of knowledge of contemporary Spain and Latin American cultures and societies, with a particular focus on the most salient socio-cultural/political issues of contemporary Spain and Latin America.

SP4241 SPANISH LANGUAGE CULTURE AND SOCIETY 1

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.

SP4243 SPANISH LANGUAGE CULTURE AND SOCIETY 3

Rationale And Purpose Of The Module:
Second year aims to build on and develop the skills introduced in the first year course: increase the oral and written ability of the students, enhance their linguistic competence, present a wide range of Spanish and Latin-American literary and cultural contents and develop further strategies for autonomous language learning.
SP4247 SPANISH LANGUAGE CULTURE AND SOCIETY 5

Rationale And Purpose Of The Module:
By the end of this module students should have:

1. developed further their command of Spanish, by focusing on oral, aural, reading and writing skills.

2. a greater analytical awareness of linguistic issues, developed in particular through translation and critical text analysis activities.

3. a deeper critical understanding of contemporary society, in particular as a result of study of contemporary literature and other text types.

4. the ability to discuss critically a variety of issues relating to Spain and Latin American societies and their connections to both European and global parameters and contexts.

GE6001 ADVANCED LANGUAGE SKILLS 1 ANALYSING MEDIA TEXTS

Rationale And Purpose Of The Module:
This module will enable students to develop their written and oral skills in German. It will also introduce them to discursive analysis of a variety of media texts relating to current topics in German-speaking countries, thereby raising their critical awareness of contemporary socio-cultural issues.

GE6021 GERMAN – IRISH CULTURAL CONNECTIONS

Rationale And Purpose Of The Module:
To explore the inter-relationship between Ireland and the German-speaking countries. To analyse historical connections and current links through variety of historical, literary and visual texts which represent, redefine and deconstruct mutual images and Austrian-Irish, German-Irish and Swiss-Irish relations. To study themes and concepts that occur in the context of bilateral relations, i.e. identity, ethnicity, history, memory, language and home.

GE4211 GERMAN FOR BEGINNERS 1

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

GE4213 GERMAN FOR BEGINNERS 3

Rationale And Purpose Of The Module:
This module completes students' basic language study. It aims to increase students' confidence in writing and speaking German and to both promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment.

GE4921 GERMAN FOR BUSINESS 1A

Rationale And Purpose Of The Module:
To consolidate existing language skills and to improve general competency in German. To provide an insight into socio-economic and political structures in Germany, Austria and Switzerland and to familiarise students with culture and history of the German-speaking countries. To introduce students to learning strategies and multimedia facilities in language learning.

GE4923 GERMAN FOR BUSINESS 3A

Rationale And Purpose Of The Module:
To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural and political structures in Germany with a special emphasis on the educational system and employment sector. To develop awareness of German companies in Ireland / Irish companies in Germany. To introduce issues in intercultural communication (German/Irish).
GE4925 GERMAN FOR BUSINESS 5A

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

Syllabus:
Lecture: Focus on the different specialisations within business studies chosen by the students; introduction to key principles of marketing, economics, human resources, insurance and accounting in German with presentations.

Tutorial: a) consolidation of topics discussed in lecture; b) discussion of authentic text material to support the lecture; c) strengthening of complex grammatical structures.

GE4141 GERMAN LANGUAGE AND SOCIETY 1 – INTRO TO GERMAN STUDIES

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

GE4143 GERMAN LANGUAGE AND SOCIETY – LIVING AND WORKING

Rationale And Purpose Of The Module:
Linguistic and cultural preparation for Co-op or SOCRATES placements in a German-speaking environment. To explain the German educational system, structures in a German company and in the world of trade and business in general patterns of everyday life. To develop students’ skills in the analysis of more complex literary texts in German. To provide students with the skills to do a presentation in the foreign language. To further consolidate grammatical structures, extend vocabulary and increase accuracy in oral and written German.

GE4147 GERMAN LANGUAGE AND SOCIETY – GERMANY, EUROPE AND BEYOND

Rationale And Purpose Of The Module:
To examine Germany’s role in present day Europe and explore the interrelatedness of German social and cultural developments with those of its neighbours. To develop inter-cultural awareness and communication skills. To continue the study of more complex literary texts in German. To develop translation skills and enhance students’ presentation skills in the foreign language.

GE4241 GERMAN LANGUAGE CULTURE AND SOCIETY 1

Rationale And Purpose Of The Module:
To provide students with an introduction to German-speaking countries as physical, cultural and political entities; to develop communicative skills by revising and consolidating basic structures and vocabulary; to introduce autonomous language learning methods. Emphasis in modules GE4241 and GE4242 is placed on establishing a solid foundation in the language; by the end of Year 1, students are expected to use all basic grammatical structures with a high degree of fluency and correctness.

GE4243 GERMAN LANGUAGE CULTURE AND SOCIETY 3

Rationale And Purpose Of The Module:
To promote intercultural awareness and provide linguistic and cultural preparation for study/work in a German-speaking environment. To enable students to acquire the necessary linguistic and cultural skills so that they may communicate effectively in a German-speaking work environment. To continue to provide an insight into socio-economic, cultural and political structures in Germany with a special emphasis on the educational system and employment sector.

GE4247 GERMAN LANGUAGE CULTURE AND SOCIETY 5

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.
GE6001 GERMAN LANGUAGE CULTURE IN EUROPE

Rationale And Purpose Of The Module:
This module will provide an introduction into theoretical approaches and their application to literary and other cultural texts in German, to help students to develop an understanding of textual representations of regional, national, and transnational identity and space in a European context. Examples will be drawn in particular from Central and/or Central Eastern Europe. The analysis of texts by German-speaking authors in this context, with its complex history of shifting political and cultural borderlines and contact points, opens different perspectives on existing concepts of German, Austrian or Swiss identity, as well as on current questions of identity on a European and global level. The course language will be mainly German. Upon completion of this module, students should be able to comprehend and discuss selected theoretical and primary texts in German, and to read literary, political and other cultural texts through the lenses of the different theories discussed.

GE4623 GERMAN LITERATURE AND CULTURE 3 – ROMANTICISM

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

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

GE6031 THE GERMAN LANGUAGE TODAY

Rationale And Purpose Of The Module:
The module is designed to develop critical approaches to the study of contemporary issues relating to the German language. Building on students’ existing knowledge, the module aims to (a) explore socio-historical and political developments which underpin the development of the German language today, with particular emphasis on Germany, Switzerland and Austria; (b) analyse key sociolinguistic and policy issues related to German; (c) enable students to undertake and present research on linguistic issues through German.

LP6011 LANGUAGE PEDAGOGY 1: THE LANGUAGE TEACHER AS PROFESSIONAL PRACTITIONER

(No description available)

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

CU4128 NEW MEDIA LANGUAGE AND CULTURAL STUDIES

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

CU4012 BRITISH RENAISSANCE ARCHITECTURE (AUTUMN)

Rationale And Purpose Of The Module:
This module aims to build upon the foundations of the introductory module CU4001 Introduction to Literature and to extend the knowledge base and competencies within the field of literature in general and Renaissance in particular.

Syllabus:
This module aims to develop the skills of analysis and critical writing with particular emphasis on British Renaissance Literature. A selection of core drama and poetry texts will be surveyed within their cultural, social, and political contexts in order to develop a secure knowledge base and critical appreciation of British Renaissance Literature and the stylistic, historical and gender dynamics of the period. Through a combination of lecture and discussion, students will be engaged in active learning both inside and outside the classroom and will be encouraged to carry out self-directed work (e.g. library and research projects) relating to the material under discussion.

CU4027 VISUAL CULTURAL STUDIES (AUTUMN/4)

3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

Visual cultural studies from the 19th to 21st centuries will be studied in this module: the theories of representation in painting, photography, cinema, television and the internet will be centred thematically around such areas as gender, race, globalisation and virtuality.

CU4027 VISUAL CULTURAL STUDIES (AUTUMN)

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

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

CU4037 EUROPEAN CINEMA FROM ITS BEGINNINGS TO THE 1950S

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

CU4097 20TH CENTURY LITERATURE IN ENGLISH

Rationale And Purpose Of The Module:
Modernism is a hotly contested term, often associated with crisis and innovation, which covers wide-ranging genres and intellectual movements. Focusing on the early decades of the twentieth century, this course covers poetry, literature and drama in English which was written at this time of shifting perspectives and social upheaval. The scope of these texts will range from the Harlem renaissance to colonialism. The course aims to give students an understanding of the relative terms modern and modernism and to identify specific aspects of Modernist texts. Through analysis of the background and aims of Modernism, and close-readings of the texts, students will develop a knowledge of the various movements alongside a wider appreciation of the genealogy of modern literature.

Syllabus:
The cultural and social context of modernism; early modernism; women writing; Harlem Renaissance; colonial texts; modernist poetry; modernist drama.
CU4121  INTRODUCTION TO NEW MEDIA AND CULTURAL STUDIES (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6

This module introduces students to the fields of cultural studies to develop an understanding of culture from a European perspective. Areas covered include: the concept of culture, the English language tradition, German theories of culture, French theories of culture, gender and race, psychoanalysis, and culture and communication. Tutorials will take the theoretical aspects and apply then to present day cultural phenomena.

CU4127 CULTURAL STUDIES 5: COMPARATIVE LITERATURE (AUTUMN/4)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

The aim of this interdisciplinary module is to examine literatures comparatively, both from the point of view of theory, and in practice. The syllabus will deal with the different issues which arise in comparing literatures: cultural similarity and diversity; nationalism; stereotypes and archetypes; post-colonialism; the use of common sources such as the classics and the Bible; cross-national literary and cultural movements such as Romanticism and Feminism; the role of translation in accessing literature; the influence of writers both inside and outside their social, national and linguistic groups; national stereotypes and clichés in literature and varying attitudes to language. A large part of the syllabus will be given over to practical applications of the issues of chosen texts.

EH4001  CRITICAL PRACTICE 1: ACADEMIC READING AND WRITING (AUTUMN/1)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

This module aims to develop the skills of literary analysis and academic writing, in tandem with an understanding of literary genres and literary theory.

EH4003  INTRODUCTION TO LITERARY THEORY (AUTUMN/3)
4 hours per week; 13 weeks/3rd semester; 26L/26T; ECTS credits: 6

What is literature? How does the historical and social context of a work alter its meaning? What influences our understanding of a literary work?

This course examines the numerous ways in which critical theory has challenged traditional assumptions about literature. A wide range of critical approaches will be discussed, and applied to two core texts.

EH4007  LITERARY MODERNISM

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

EH4013  SENSIBILITY AND ROMANTICISM (AUTUMN/2)
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

The aim of this course is to provide students with a survey of literature 1770 to 1830. This course aims to immerse students in the literary language of the time, and instructs them in ways to respond to this literature in ways which are critically and historically informed.

EH4023  THE NEW WORLD: AMERICAN LITERATURE TO 1890

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

**EH4027 CONTEMPORARY WOMEN’S WRITING**

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

**Syllabus:**
This course will introduce students to a number of key fictions by British and North American women authors, written between the 1970s and the present day. We will examine the ways in which these fictions respond to the changes in female experience in the second half of the twentieth and beginning of the twenty-first century, as well as exploring how these fictions reflect upon, and re-figure, conventional understandings of gender identity. Key issues for discussion will be the ways in which these texts respond to their social and cultural contexts, and how gender identity is shaped by location and place in these contexts.

**EH4028 STUDY OF A MAJOR IRISH AUTHOR**

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

**Syllabus:**
This module will function as a critical survey of the work of a major Irish author. Students will study the authors development from early efforts to mature output and will analyse and discuss the authors overall impact on literary history. The module will position the author historically and politically, considering the authors role as a contributor to intellectual history. By locating the author in different theoretical and methodological frameworks, students will have the opportunity to assess and interpret a wide range of the authors work.

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

**ES4001 EUROPEAN STUDIES: A GLOBAL PERSPECTIVE**

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

Syllabus:
This introductory module is organised around selected set of themes in the interdisciplinary field of European Studies. Each theme set is formulated as a question put to participants, for unpacking, development, autonomous research, and intensive, teacher-facilitated discussion. The central focus of the module will be on fostering in new entrants the skills necessary for full engagement with the European Studies degree. Topics for study may include the following: Geographical and territorial definitions of Europe. Linguistic issues in Europe. Unity and diversity of European culture. The ‘cultural industry’ in Europe. ‘European’ values, democracy and diversity as case studies. The question of a ‘European’ economic model. Citizenship in European and global contexts. The role(s) of Europe within globalisation and a wider ‘world’ system. Colonialism, its practices and its legacies. Ireland in a European and a global context.

**GA4011 CELTIC CIVILISATION: CULTURE, LANGUAGE AND REPRESENTATIONS**

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

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

**GA4105 IRISH FOLKLORE 1**

(AUTUMN/3)
4 hours per week; 13 weeks/4th Semester;
26L/26T; ECTS credits:6

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; traditional custom and belief including calendar customs. A case study in folklore collection based on field recordings made in county Limerick in 1980.

**GA4115 IRISH LANGUAGE 1**

(AUTUMN/3)
5 hours per week; 13 weeks 4th Semester;
26L/39T; ECTS credits:6

An introductory course in communicative Irish, the language content of which is based on scientific research on frequencies of lexis, verbal forms and syntactical patterns in conversational Irish; the external history of the Irish language; introduction to early Irish literature.

**GA4163 BEGINNERS IRISH 3**

To encourage transfer of oral and written communicative skills to a wider range of situations. To consolidate and revise the grammar, pronunciation and communicative skills acquired in the first two semesters. Students will progress to a level suitable to undertake a coop placement in Irish and join students who have successfully completed modules Teanga, Sochaí agus Saíocht 1-3, in Semester 6.

**HP4517 LANGUAGE, LITERATURE AND FILM PROJECT 1**

*Rationale And Purpose Of The Module:*
The purpose of the module is to provide a framework in which the supervisor will offer encouragement and feedback to the student as well as continuous guidance with the writing process of their final year project.

*Syllabus:*
Completion of the collection of data; Initial drafting of chapters; feedback from supervisor; redrafting and editing; writing of introduction and conclusion; production of bibliography, abstracts, table of contents, appendices and title page according to agreed protocols.
JA4211 JAPANESE LANGUAGE, CULTURE AND SOCIETY 1 (AUTumn/1)
6 hours per week; 13 weeks/1st semester; 39L/39T; ECTS credits: 6
Listening practice leading to recognition of numbers, times, days, dates, locations; conversation practice based on grammar structures and vocabulary necessary to introduce oneself politely, ask basic questions, explain schedules, and talk about pastimes; reading and writing practice introducing the hiragana and katakana writing systems and 80 kanji, progressing from the understanding of notices and posters to descriptions of people’s everyday lives; writing passages involving self-introduction, daily routines, hobbies, and shopping; also discussion in English about Japanese customs, culture and society.

JA4247 JAPANESE LANGUAGE, CULTURE AND SOCIETY 5 (AUTumn/4)
6 hours per week; 13 weeks/3rd semester; 39L/39T; ECTS credits: 6
Authentic listening practice, especially broadcast news; test items from JLPT level 2 tests; speaking practice involving further use of polite language; presentations about work experience and current affairs; spoken summaries of reading and broadcast material; reading of authentic passages including news stories and literature; translation of a variety of passages into English; writing of summaries, descriptions, and letters of various levels of formality; study of a further 150 kanji.
Prerequisite JA4216

JA4213 JAPANESE LANGUAGE, CULTURE AND SOCIETY 3 (AUTumn/2)
6 hours per week; 13 weeks/3rd semester; 39L/39T; ECTS credits: 6
Understanding of instructions, needs and wants, descriptions of events in order. Speaking exercises explaining actions in sequence, telling stories, making requests and asking permission. Reading more demanding passages about Japanese life and society. Written exercises concentrating on descriptions and narratives; also memos, letters and notes.

JA4911 JAPANESE FOR BUSINESS 1A (AUTumn/1)
6 hours per week; 13 weeks/1st semester; 26L/39T/13LAB; ECTS credits: 6
Elementary daily conversation through role play exercises and pronunciation practice in the language laboratory; simple question and answer exercises; the Japanese syllabary alphabets (Hiragana and Katakana);

JA4917 JAPANESE FOR BUSINESS 7 (AUTumn/4)
6 hours per week; 13 weeks/7th semester; 26L/39T/13LAB; ECTS credits: 6
Business project in Japanese: advertisements in both written and oral forms; further business communication: discussing price and quantity; introduction and intermediate grammatical structures; introduction of a further 70 kanji (total 430)

TW4003 INTRODUCTION TO TECHNICAL COMMUNICATION
(No description available)

TW4115 PRINCIPLES OF PROFESSIONAL AND TECHNICAL COMMUNICATION AND INFORMATION DESIGN
Rationale And Purpose Of The Module:
To introduce students to the disciplines of technical and professional communication and information design.
To establish a rigorous standard in the writing of clear, concise, correct English appropriate for technical communication.
To develop the students’ ability to choose appropriate writing styles for a range of technical communication genres and diverse audiences.
To provide practice through a range of assignments designed to improve the students’
performance in creating different types of documentation: manuals, online help, brochures etc.
To develop the students' expertise in using the tools of the profession.

JM4021 JOURNALISTIC WRITING 1

Rationale And Purpose Of The Module:
Journalistic Writing 1 aims to introduce students to the broad range of writing in journalism, from newspapers to magazines of all types, both print and internet. It aims to teach students to write short news stories for a variety of publications, including local and national newspapers and websites.

Syllabus:
Students will learn the principles of news reporting, including grammar and working to a style book. They will learn by comparing reports in national and local newspapers and magazines. They will have extensive practice in creating news stories. They will learn to report from speakers, radio and TV programmes and documents and will practise writing intros and structuring a news story both for print and the internet. They will learn about newsroom practices, journalistic routines writing to deadlines. Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

JM5011 JOURNALISTIC WRITING FOR NEWS

Rationale And Purpose Of The Module:
Journalistic Writing News aims to equip students to tackle a broad range of news stories, including stories from interviews, documents, radio and television and lectures and speeches. It will introduce students to different styles of writing for different media.

Syllabus:
Students will learn the principles of news reporting, including grammar and working to a style book. They will learn by comparing reports in national and local newspapers and magazines. They will have extensive practice in creating news stories. They will learn to report from different sources and will practise writing intros and structuring a news story both for print and the internet. They will learn about newsroom practices, journalistic routines writing to deadlines. Assessment will be by the production of a portfolio of work completed during the course, and a final timed examination.

JM5051 PROFESSIONAL SKILLS FOR JOURNALISM AND TEAM PROJECT

Rationale And Purpose Of The Module:
Professional Skills for Journalism aims to introduce students to the range of skills needed for editing and headline writing for print and internet and designing and creating for print and internet.
The Team Project aims to polish students reporting, writing and designing skills to a professional level. It will enhance their ability to work in a team and to meet deadlines.

Syllabus:
Students will learn the principles of professional editing, headline and standfirst writing and cutting to length. They will be introduced to the basic principles of illustrating news including taking photographs and generating graphics. They will learn print and website design and will create their own websites. Students will produce a local newspaper or magazine (print or internet-based) for the Team Project. They will write news, features, analysis and editorials; source pictures, design pages and edit accurately. Assessment will be on work produced during the course, a final timed examination (6 credits) and on each individual students contribution to the team project.
GY4016 ECONOMIC GEOGRAPHY (AUTUMN/3)
3 hours per week; 13 weeks/6th semester; 26L/13T; ECTS credits: 6

The economy and economic geography; manufacturing activity and least cost location theory; Weberian location theory; transportation cost as a factor of location; production costs and location; scale and agglomeration; spatial behaviour of large organisations; deindustrialisation and tertiarisation; nature of service activity; market area analysis; central place theory; quaternary activities and office location; location and public policy.

HI4007 HISTORIOGRAPHY (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

The syllabus will be principally designed around discussions on questions of historiography and how past and recent controversies provide insights into interpretative differences for understanding both history and myth; enlightenment and romanticism; thinkers, philosophers and philosophies of history/historicism; empiricism and ‘scientific’ history; the influence of propaganda and secrecy; Marxism; the Annales school; revisionism; post-colonialism; gender and ethnicity; the peripheries of historical knowledge; the archive; subaltern studies; memory and remembering to forget; public history and commemoration; the end of history?

HI4043 EUROPE: ENLIGHTENMENT & REVOLUTION 1688 – 1815 (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

Changing mentalities in eighteenth-century Europe; the emergence of Russia and Prussia; the expansion of Britain as a world power; the Enlightened absolutist rulers; Spain in the eighteenth century; the collapse of the Old Regime in the 1780s; European revolution in the 1780s and 1790s; Napoleonic Europe; reaction, conservatism and romanticism, 1815–1830; Austria in the age of Metternich; the revolutions of 1848.

HI4053 IRELAND: 1750 – 1850 (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits: 6

Diverse societies, economies and cultures: disunited kingdom and discontented colony; owning, managing and working the land: the rural economies; subsistence, markets, production and surplus; the long-term demographic trend and the demographic transition; family and household; gender, sexuality and patriarchy; proto-industrialisation, urban growth, and the modernisation of industry; breaking and making the union; professional society and the urban proletariat; the transformations of language use; Anglicisation 1750-1914; the failure of economic capacity: coping with poverty; rural prosperity and rural crisis; the triumph of capitalism.

HI4061 REFORMATION AND THE MODERN STATE: EUROPE IN THE 16TH CENTURY

Rationale And Purpose Of The Module:
This module aims to give students a thematic and chronological overview of the history of continental Europe during the sixteenth century. It is intended as a gradual introduction for first-years into the early modern period, and covers a shorter and more manageable time-frame than the previous practice of teaching two centuries in one semester.

Syllabus:
The waning of the middle ages and the culture of the renaissance; the political geography of early modern Europe - republics, new monarchies and composite polities; Europe in the broader context of the discovery of America; diet, demography and disease; a society of estates - nobles, clergy, merchants and peasants; family life - birth, marriage and death; Charles V, Francis I and the Habsburg-Valois conflict; Luthers protest and the Evangelical movement in Germany and Scandinavia; Calvin and the second Reformation; capturing the hearts and minds of the ordinary people - preaching and literacy; the response of the Catholic Church - Jesuits, the Council of Trent and the alliance of Church and State; Wars of Religion in France and the Netherlands; Philip II and Spanish world hegemony.

HI4112 SOURCES FOR HISTORY

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

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

HI4127 UNDERSTANDING THE HOLOCAUST IN 20TH CENTURY EUROPE

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

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

HI4147 IRELAND AND THE USA, 1790-1960; A SPECIAL RELATIONSHIP?

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

Syllabus:
Introduction ‘Shared Histories’ 1760-1800; ‘Laying the roots of the relationship’, 1700-1845; Crises in the emerging relationship, 1845-51 - Famine; Crises in the emerging relationship, 1861-5 American Civil war; The relationship expands, 1865-1913 - Creating an Ireland in America?; ‘Irish nationalists dare to hope’ - Woodrow Wilson; The limits of the relationship, 1916-22 - An official relationship; The relationship tested 1922 to 1945; Restoring the relationship, 1945-69 (Film ‘The Promise of Barty O’Brien’) Emigration, exile and the Irish in American and Irish culture; What does America mean to you? The concept of America in the Irish identity in the twentieth century.
The Faculty of Science and Engineering offers exciting opportunities for career and personal development in an environment that supports a high quality undergraduate and post graduate experience. The faculty prides itself on the quality of its teaching and learning personnel and programmes having three world-class research institutes in the areas of Materials and Surface Sciences, Software Engineering and Mathematics which are underpinned by well established links with industry. Cooperative Education (work placement in industry or teaching practice as appropriate) is an integral part of all our undergraduate programmes and we continually keep all programmes under review to ensure they meet the requirements of employers as well as national and international bodies. Emphasis is placed on easing the transition from second level to third level by providing special guidance and care for first year students entering our programmes. The Mathematics Learning Centre and the Science Learning Centre offer one-to-one support, additional tutorials and a supervised study area. Access to personal tuition and additional learning resources is open to all students. We value the participation and contribution that students from different backgrounds and cultures make to campus life in particular through their involvement with the many University sport and recreational clubs and societies that are on Campus.
ARCHITECTURE

AR4031 – HISTORY AND THEORY OF ARCHITECTURE 1
5 hours per week; 13 weeks/1st semester;

The first year program in History-Theory aims to expand students’ horizons of knowledge about architecture while teaching foundational skills in reading and writing in the discipline. Even though students at the School of Architecture are expected to be highly literate and articulate, entering into a new field 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 a selection of the monuments of modern architecture together with contemporary ways of thinking about the field.

AR4033 - HISTORY AND THEORY OF ARCHITECTURE 3
5 hours per week; 13 weeks/1st semester;

The second year program in Architectural Research provides students with a comprehensive survey of the history of architecture and urbanism in the programme curriculum. This module exposes students to the relationship of architecture to technology and materials, both naturally occurring and those produced by man both in Ireland and globally. The goal for the course is to give students a broad introduction to architecture throughout the ages, from the classical Greek and Roman periods to the present day while introducing them to the role that materials and technology have in architecture.

AR4001 DESIGN STUDIO 1A
15 hours per week; 13 weeks/1st semester;

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.

AR4005 – DESIGN STUDIO 3A
15 hours per week; 13 weeks/5th semester;

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 first term is on developing a thoroughly researched design proposal and to produce a set of competent design documents.

AR4007 DESIGN STUDIO 4A
15 hours per week; 13 weeks/7th semester

In Y4 students start a personal pursuit; they must - through their design projects and their research work - relate to the world of architecture in their own personal way. Students are expected and asked to voice their position in architecture, to find their direction through architectural design. Students develop a method of research and allocate significant time to the research part of the curriculum.

The architectural project is tightly allied to construction and the physicality of building; construction technology is an important part of the years work. A research led project in the autumn semester opens the expanse of architectural intelligence into circumscribed cultural and environmental fields. Students develop a fluency in the means of making of and thinking through things in terms of structure, technology, and environment to the point where they can rise above the practicalities and conceptualise as well.

AR4011 – GRAVITY AND REACTION 1
5 hours per week; 13 weeks/1st semester,

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

AR4013 – GRAVITY AND REACTION 3
5 hours per week; 13 weeks/3rd semester;

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

**AR4015 – GRAVITY AND REACTION 5**
*5 hours per week; 13 weeks/5th semester;*

In depth study of Load Path, in depth study of structural form, particularly as it relates to specific material properties. Learning through the analysis of structural models using experiment, project work and formal learning. Give students a strong conceptual and formal grasp of materials used in structural design, which are applicable to actual conditions.

**AR4021 – REPRESENTATION / DRAWING 1**
*5 hours per week; 13 weeks/1st semester;*

To establish drawing as a tool of observation, a tool of thinking and a tool of representation, this course is composed of two different types of drawing exercises:Studio based exercises with weekly changing subjects introducing key aspects of architectural vocabulary (light and space, site, human scale, skin and comfort, flows and organisation, vision and architecture). Short introducing lectures are followed by a drawing or sketching exercise, and, in the next step by a model making exercise, where the drawings from the exercise have to be interpreted and transformed into the 3rd dimension.

**AR4023 – REPRESENTATION / DRAWING 3**
*5 hours per week; 13 weeks/1st semester;*

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.

**AR4025 – REPRESENTATION / DRAWING 5**
*5 hours per week; 13 weeks/1st semester;*

In this module students are introduced to the computer and related modes of representation, in conjunction with continuing studies in hand drawing. Switching between virtual and analogue modes of representation, e.g. models, drawings, digital photography, photoshop, illustrator, and other graphics programmes will be explored as tools of transformation and spatial, logical, and structural exploration.

**AR4041 – ASSEMBLY AND TECHNIQUES 1**
*5 hours per week; 13 weeks/1st semester;*

This course will introduce basic constructional principals through the detailed study of elements of simpler constructional technology. This technology is considered from the point of view of design intent, logic of assembly and the quality of the resulting climate/environment. The course will further challenge the students to analyse the built environment they are familiar with under these themes. The suitability of various forms of construction to different design ambitions will be considered with particular emphasis put on developing an understanding of the size and dimensions of various constructional systems. The course is intended as a foundation course in itself as well as anticipating the information required in the design studio. The course is seminar based with an individual student research component.

**AR4043 – ASSEMBLY AND TECHNIQUES 3**
*5 hours per week; 13 weeks/5th semester;*

The aims of this class are: a. to introduce students to the initial studies required to later generate a comprehensive set of working drawings of a third year design studio project. b. to develop further the student’s own intuitive skills in technique alongside knowledge of available construction technology today. c. to develop the students capacity to interrogate and develop design decisions through construction principles.

**AR4051 – ENVIRONMENTAL SYSTEMS AND FORCES 1**
*5 hours per week; 13 weeks/1st semester;*

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 it’s 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.

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**AR4053 - ENVIRONMENTAL SYSTEMS AND FORCES 3**
5 hours per week; 13 weeks/3rd semester;

Advanced understanding of physical backgrounds and interconnections for sustainable development, and the integration of environmental principles into architectural works. Emphasis will be placed on the study of material properties. Particular attention will be paid to integration of environmental principles into design studio work. Specific material properties will be studied, and modelled.

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**AR4073 – DESIGN STUDIO 2A**
15 hours per week/3rd semester;

Phase I Using mapping as a vehicle for speculative architectural analysis, students will map one defined aspect of a particular place as ground, infrastructure, climate and occupation of space. Through mapping, students will confront their first analysis with more specific information: climate, ground, geology, built structures, growing structures, water treatment and flows, infrastructural networks, historic traces, land use and occupation of space. It is about identification of specifics through drawing, registering, measuring, timing, investigating; observe on site at several occasions and document, explain conditions, situations, make drawings, diagrams and sketches to explain conditions Phase II Explore settings for physical activity and for the interconnection that happens between spectator and sport and between land and the body. Cultural and technical characteristics of sport must be integrated into the land in a way, which will change it consciously. Students first make a first landscape urban proposition (MODEL) plus make a set of drawings showing dimensional sizes for activities include heights PLANS, SECTIONS, Make a set of investigations of three different structures and how they work with the land. Development Synthesis Two: Choreography, colour, light, material, crowd versus the individual delineation, studies Development Draw Up and review MODEL The design studio is co-ordinated with the content of parallel course modules and integration between studio work and course module work is a vital and innovative component of the studio structure.

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**AR4099 DESIGN STUDIO 5A-PRE-THESIS**

Rationale And Purpose Of The Module: The thesis project should span over two semesters. 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 5a and 5b increase to 18 and 21 credits respectively while the number of parallel modules is reduced

**Syllabus:**
Fifth-year Design Studio invites the student to engage with complex large-scale architectural design problems. These problems aim to enable multiple scales and programmes to be managed within a tight set of constraints, both physical and temporal. Students will deepen the strength, breadth and application of their conceptual approach and will integrate increasingly sophisticated structural and environmental solutions at a large scale.

Thesis will be a year-long piece of work, initiated by a proposition written at the start of the autumn semester. This proposition is tested against a theme (rather than a place) and will act as a framework within which ideas are developed. Students are invited to engage in sharpening architectural positions and idioms, and refining design methods, in the context of contemporary society and in relation to current architectural and cultural debates. Through explorative projects and research, students situate their work on an expanding platform for discussion, engaging with current issues facing the city and the region, related to both national and international contexts.

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**AR4317 ADVANCED CONSTRUCTION 1**

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

**Syllabus:**
Architecture students learn best by imagining, developing and realising (full scale) prototype structures through which ideas can be tested, documented and communicated. Through actual engagement in all the stages of making and building, students have a unique opportunity to develop a rich phenomenal understanding of architecture. Closely related to Design Studio, Advanced Construction informs and supports the students individual design studio projects; directed and independent research on advanced construction is applied to these projects.

After revisiting traditional and conventional (vernacular) forms of building taxonomy and production techniques in a range of materials (stone, concrete, metal, timber, fabric and polymers) staff and students engage more advanced means of fabrication (including...
milling, folding, laminating, sewing, stacking, interlocking, hanging, injection moulding, compositing, extrusion, weaving and bundling). Spatially and programmatically this will entail various degrees of articulation from the standardised, low-tech component to the highly articulated formal element, avoiding self similar repetition in favour of the diversity of the composite.

AR4319 ADVANCED CONSTRUCTION 3

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

Syllabus:
The series of modules in Advanced Construction expands the scope of students competencies in building technologies and construction beyond traditional methods and their related familiar scale. In the final year, students engage in a tested dialogue with concerns of design, structure, environment, history and theory, representation, digital media, and other related areas and interests.

Staff and student undertake in-depth research into specialist areas of technology. Case studies focus is on an integration of structural and environmental systems in response to specific conditions that require complex skills in analysis and/or design. The students are expected to apply findings from directed and independent research on advanced construction technologies to develop each student's thesis proposal individually.
Syllabus:
Gravity + Reaction = Equilibrium (stable, neutral, un-stable);
Newton’s Laws;
Human Arch; concepts of gravity, reaction, forces, friction, free-body diagram;
Structural forms; natural and man-made;
Loading; dead, imposed, thermal, wind and dynamic;
Free Body Diagrams;
Equations of static equilibrium; vertical, horizontal and moment equilibrium;
Support condition; pinned, roller and fixed;
Internal member behaviour; axial tension / compression, bending and shear;
Failure modes, individual elements, buckling of compression members, tensile, bending/shear; overall stability; construct simple models to illustrate modes of failure;
3-pin arch structures analysed using precedent studies support reactions under different loading conditions;
Basic member sizing under axial tension, Basic foundation types and foundation sizing;
Introduction to research methods and resources;
Initial 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.

CE4003 FLUID MECHANICS
Rationale And Purpose Of The Module:
Aims & Objectives:
Introduce the physical processes which govern the behaviour of liquids at rest and in motion, relating to hydraulic engineering.

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

Syllabus:
* Review the properties of Fluids, Hydrostatic forces and Pressure measurement.
* Principles of Fluid Flow: Conservation of mass, momentum and energy. Continuity, momentum and Bernoulli’s equations.
Applications of conservation laws in fluid flows.

CE4005 STRUCTURAL THEORY
Syllabus:

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

Syllabus:
Context and principles of water management from catchment to consumer; structural and hydraulic components of water distribution systems (reservoirs, pump stations, surge tanks) and water / wastewater collection systems (manholes, combined sewer overflows, siphons, pumping stations, attenuation tanks); pipeline construction techniques and their application for specific site and ground conditions; development and use of simple numerical analysis tools for the design and sensitivity analysis of hydraulic systems; analysis and design of water storage and distribution systems, including flow demand, storage requirements, flow pressure and control; analysis and design of surface / wastewater collection systems, including assessment of hydraulic loads, network capacity, flow velocity, sediment transport, design & application of hydraulic structures; hydraulic design of treatment plants; hydraulic
profiles; long term economic and sustainability design and operation of hydraulic systems.

CE4013 STRUCTURAL ANALYSIS

Syllabus:
SI units and manipulation of formulae, sources and types structural loading, reactions and supports, free body diagrams, shear force and bending moment calculations, static determinacy and indeterminacy, qualitative analysis of beams and frames, stability and analysis of pin jointed frames, section properties, engineers equation of bending.

CE4015 SOIL MECHANICS

Rationale And Purpose Of The Module:
This module builds on the material covered in WT4014 by further exploring soil mechanics using critical state theory. The course is designed to challenge the student to master the key concepts in soil mechanics and apply these concepts in projects and self-directed learning to achieve the following key objectives:

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

Syllabus:
* Basic mechanics
  Stresses, strains; plane, axial symmetry, 2-D and 3-D conditions; stress ratio and dilation; slip surfaces; analysis of stress and strain and Mohr’s circle; essentials of material behaviour; Stress-strain behaviour, stiffness and strength; Choice of parameters for stress and strain; Constitutive equations; Time & rate effects
* Laboratory testing of soils
  Standard tests, purposes and specification; Shear box, triaxial and oedometer tests; Interpretation OCR.
* Consolidation
  Basic mechanisms of consolidation and 1-D consolidation theory; Solutions and applications for 1-D consolidation; Determination of cv, cc and cs from oedometer tests; Calculation of foundation settlement
* Critical state strength of soil
  Soil behaviour in shear; Peak, ultimate and residual strengths; Critical states; Undrained strength; Estimation of critical state strength parameters from classification tests
* Cam clay model

CE4027 ADVANCED STRUCTURES

Rationale And Purpose Of The Module:
Module modified to reflect movement of more advanced topics from earlier structural engineering modules. This facilitates the advanced topics to be explored in greater depth in this module.

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

CE4033 MODELLING AND ANALYSIS OF FLUID SYSTEMS

Rationale And Purpose Of The Module:
The purpose of this module is to two-fold. Students are introduced to scale analysis techniques and taught how to interpret and use existing correlations, as well as develop their own from experimental data. Secondly, students are introduced to the concept of potential flow and apply the theory to solve various problems commonly encountered by civil engineers.

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

CE4035 REINFORCED CONCRETE AND MASONRY DESIGN

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

Key objectives
To master the concepts of design in steel reinforced concrete.
To develop the key concepts in pre-stressed concrete;...
concrete design.
To introduce the concepts in the design of unreinforced and reinforced masonry.

**Syllabus:**
Properties of reinforced concrete (RC);
Principles of limit state design; Analysis of the RC section; stress-strain characteristics of steel and ultimate strain of concrete, stress block and strain profile, balanced, over- or under-reinforced sections; Design of single span, flanged and continuous RC beams; flexure and shear resistance; Serviceability and durability of reinforced concrete; Limiting span/effective depth ratios; Choice of appropriate RC slab type; Design of RC slabs, one-way, two-way and flat slabs; Punching shear resistance; Design of RC Columns, design formulae and design standard procedure for short/slender columns, principles of axial load-moment interaction diagram, balanced failure design, load and moment analysis; Design of RC retaining walls and foundations; RC Detailing; bondage, anchorage and curtailment.

Design of unreinforced masonry subjected to vertical and lateral loading.
Introduction to pre-stressed and post-tensioned concrete technology.

**CE4045 PROFESSIONAL PRACTICE 1**

**Rationale And Purpose Of The Module:**
The objective of this module is to engage the student in professional practice skills through the medium of problem-based learning. The module involves an overview of Health and Safety in the construction industry and project work integrates core skills in CAD and land surveying in advance of cooperative education in semester 6.

The module is 100% continually assessed and non-repeatable.

**Syllabus:**
The Planning System: Making a simple planning application.
Computer Aided Drafting: Overview of current industry practice and trends in drawing and integration of CAD with the design process. Operate a proprietary 2-D CAD system to produce survey and planning drawings. Operate a proprietary 3-D CAD system to produce a rudimentary 3D model and associated plan and sections.
Land Surveying: Overview of land surveying methods and principles. Overview of GIS. Surveying and setting out using total station and levelling equipment operation, data recording and production of a topographical survey drawing. Setting out of a simple building.

**CE4047 WIND, OCEAN AND HYDRO ENERGY**

**Rationale And Purpose Of The Module:**
The purpose of this module is to introduce civil engineering and energy students to national and EU policy, resource assessment, conversion principles and electricity generation potential associated with renewable energy generated from wind, ocean & hydro resources. This will equip students with the knowledge and analytical skills necessary to advise on their appropriate use at specific sites.

**Syllabus:**
Wind Energy Onshore & Offshore: Market status and current trends; Site and Resource Assessment; Supporting Structures; Aerodynamic and Power Conversion Principles; Power Predictions with Statistical Analysis; Economic Assessment with review of National and EU policy; Storage Mechanisms
Hydro-Energy: Market Status and Current Trends; Catchment Areas; Dams; Weirs; Hydrodynamic and Power Conversion Principles; Environmental Impact; Layout of Hydro Power Systems; Power Output; Economic Assessment; Peak Load Management

**MT4023 MATERIALS 2**


**MT4101 INTRODUCTION TO MATERIALS (AUTUMN/1)**

5 hours per week; 13 weeks/1st semester; 26L/13T/26LAB; ECTS credits: 6

Historical background to development of materials; materials science; classes of modern materials; metals; polymers; ceramics and glasses; composites; origin of these materials; properties; applications; related to properties.

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**Faculty of Science and Engineering**

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**CIVIL ENGINEERING & MATERIALS SCIENCE**
MT4105 QUALITY SYSTEMS  
(AUTUMN/3)  
4 hours per week; 13 weeks/5th semester;  
26L/26LAB; ECTS credits:6

To form an understanding of the concepts behind the ISO 9000 standards, product testing and certification. How quality standards operate in Irish manufacturing and service industries. How the standards relate to Total Quality Management (TQM). How to document and maintain a Quality System. How to quantify the cost of quality within companies. To develop an understanding of the basic tools of statistical process control.

MT4205 FAILURE PROCESSES  
(INCLUDING FM)  
(AUTUMN/3)  
5 hours per week; 13 weeks/5th semester;  
26L/13T/26LAB; ECTS credits:6

Fracture; linear elastic fracture mechanics; fatigue - life prediction; stress corrosion cracking; corrosion mechanisms; protection processes; creep mechanisms.

MT4207 FAILURE AND DAMAGE  
ANALYSIS  
(AUTUMN/4)  
5 hours per week; 13 weeks/7th semester;  
26L/13T/26LAB; ECTS credits:6

Analysis of failure and damage; modes of failure; procedures of failure analysis; implications of failure analysis; experimentally based mini-projects; case studies.

MT4905 MATERIALS TECHNOLOGY 3  
(AUTUMN/3)  
4 hours per week; 13 weeks/5th semester;  
26L/26LAB; ECTS credits:6

Principles of polymer processing; extrusion; injection; materials, techniques; compression, transfer and rotation, die filling, cycle, process control, effect on properties; blow moulding and vacuum forming moulding; cellular polymers.

MT4943 MATERIALS PROCESSING  
(AUTUMN/2)  
4 hours per week; 13 weeks/3rd semester;  
26L/26LAB; ECTS credits:6

Metals; casting; forming; extrusion, forging, rolling, sheet metal work; joining; mechanical, welding, adhesion, brazing; polymers; processing techniques.

MT4003 CONSTRUCTION TECHNOLOGY AND MANAGEMENT 2  
(AUTUMN/4)  
5 hours per week; 13 weeks/7th semester;  
26L/13T/26LAB; ECTS credits:6

Rationale And Purpose Of The Module:  
The aim of this module is to provide a comprehensive introduction to industrial, high-rise and construction practice and technology

Key objectives  
Provide knowledge of  
* Organising and selecting resources needed to successfully complete the project  
* The principles of erecting large structures and the various forms they take.  
* Internal and external components of industrial and high rise structures  

Syllabus:  
Site works, site layout, electricity on building sites; Plant and equipment; Substructure construction, ground water control, deep trench excavations, cofferdam and caissons, tunnelling and culverts; Underpinning, piled foundations; Demolition and temporary works. Portal frames; Introduction to highrise construction, Introduction to fire protection; Claddings to framed structures; Formwork systems; Pre-stressed concrete; Industrial buildings.

WT4017 ENERGY EFFICIENT BUILDINGS

Syllabus:  
Background: Energy supply and demand, climate change, energy performance of buildings directive and Irish legislation, technical guidance documents Part-L.  
Energy: Supply and demand considerations for domestic buildings (new and existing)  
Concepts of Temperature and Heat Energy:  
Concepts of conduction, convection and radiation; thermal bridging; heat energy and energy losses of materials; U-value; heat loss and heat gain; energy performance; thermodynamics and heat; energy balance; air flow and energy transfer.  
Electrical and Lighting Energy assessment:  
Principles of measurement from plans, surveys and drawings; electrical measurements; electrical devices and efficiency.  
Energy Efficiency, Energy Storage and Control: Fundamental principles; principles of energy storage; heat capacity; thermal mass; heat and water; temperature measurements and control; energy sources; energy conversions; fuel, combustion and CO2 emissions; greenhouse gases; carbon dioxide emission rating; solar energy; thermal
mass; solar gains; solar collectors; efficiency adjustment factors; primary and secondary heating systems; single and immersion heaters; carbon dioxide emission rating. Building Energy Ratings in domestic buildings; Use of Dwelling Energy Assessment Procedures (DEAP) software for new and DEAP+ for existing buildings; generation of advisory reports. Introduction to BER in non-domestic buildings; Introduction to SBEM for new and existing non-domestic buildings. PassivHaus Standard. Exemplar Buildings.

**WT4105 WOOD SCIENCE 3**

**Syllabus:**
Mechanical properties of wood
- specific gravity, density, concept of cellular solids
- elasticity, anisotropy, plasticity, creep, mechanosorption
- tensile strength, modes of failure, fracture toughness
- compressive strength, crushing, kinking, bending
- hardness and abrasion resistance.
Introduction to stochastic design methods and characteristic strengths.

**WT4117 STRUCTURAL DESIGN**

**Rationale And Purpose Of The Module:**
The aim of this module is to provide a basic understanding of structures and the design of principal structural elements.

**Syllabus:**
Basic structural concepts and material properties, design loads, limit state design principles, beam design, axially loaded column design, column base & splice details, design of tension members and compression members, design of simple connections, trusses and bracing, floor design, introduction to structural detailing: bearing pressures, design of shallow foundations, introduction to lateral stability.

**WT4203 FURNITURE DESIGN**

**Rationale And Purpose Of The Module:**
To give the student:
an appreciation of product design development and progress in a historical context, and an understanding of the underlying principles which influence contemporary furniture design.

**Syllabus:**
Design and problem solving skills
Timbers/materials predominantly used in furniture manufacture
Mechanics of design/forces in relation to furniture design
The golden ratio and the importance of proportion
Graphical communication skills
Manufacturing process/techniques
Classical orders of architecture
Mechanics of design/forces in relation to furniture design
Memphis case studies

**WT4301 BUILDING AND CONSTRUCTION REGULATIONS 1**

**Rationale And Purpose Of The Module:**
The overall aim of this module is to provide an introduction to health and safety principles and practices in building and construction.

**Syllabus:**
Introduction: terminology / why manage safety?
The Importance of HS&W
Recognising hazards and the Safety culture
Safety, Health and Welfare at Work Law in Ireland the 2005 Act
The Safety Statement and Risk Assessment
Overall View of Construction Regulations
Impact on Work
Construction Duty Holders
HS&W at work regulations accident/ near miss/ dangerous incident reporting and investigation.
Starting on Site
Manual Handling
Underground Services
Safety in excavation and confined spaces
Working at heights
Work equipment
Noise induced hearing loss
Chemicals and dangerous substances
Emergency preparedness
Construction Techniques
Housekeeping
Welfare
Communication and Coordination
Training

**WT4303 MACHINING TECHNOLOGY 1**

**Rationale And Purpose Of The Module:**
To introduce the student to basic concepts in the wood processing stream from forest to finished product. To explore the evolution of tools and machinery in this wood processing stream. To explore the physical characteristics and performance of wood at a core level.

**Syllabus:**
Trees and forests, wood as a forest product, wood-based products, LCA of wood and wood products.
Wood tools and machines [tool point and edge, hand tools, single phase tools, 3phase tools, machining systems]
Relationship between traditional and modern wood working

**WT4305 MACHINING TECHNOLOGY 3**

**Rationale And Purpose Of The Module:**
To enable the student to effectively analyse and solve problems associated with complex product manufacture in the context of
advanced manufacturing processes and systems
CAD/CAM programming, R.F. and Glulam.
To explore the potential of current technology
in respect of value added processes for Irish
grown timber.

Syllabus:
Lean manufacturing
Production systems-plant layout
Group technologies
Gluing
Manufactured boards
Glulam
Radio frequency gluing
Analysis of tool design û variable angled cutter
block.
Advanced CNC manufacture
Jig design

WT4401 CONSTRUCTION
TECHNOLOGY AND MANAGEMENT 1

Rationale And Purpose Of The Module:
The aim of this module is to provide a
comprehensive introduction to every
aspect of the technology of domestic low-
rise construction, and to present this in a
rational and logical progression reflecting the
construction process.

Syllabus:
Introduction to the Building Regulations and
Technical Guidance Documents.
Site works, temporary works, subsoil drainage,
evacuations, scaffolding.

Radon problems and prevention. Radon
membranes and sumps.
Substructure construction techniques,
foundations û strip, raft and piled, concrete.
Damp proof courses and membranes.
Superstructure construction techniques,
stonework, brickwork, blockwork, cavity walls.
Timber framed construction. Components.
Site control. Insulation and dampoofing.
Floors - suspended timber, raised access,
prefab concrete, hollow block, waffle slabs.
Roofs û timber, flat and pitched, tiling, asphalt
flat roofs, roof lights and ventilation.
Stairs û timber, reinforced concrete and precast
concrete.
Detailing of opes, eaves and other junctions.
Sound insulation û airborne, impact &
flanking. Soundproofing.
Thermal insulation, thermal bridging,
condensation and draughtproofing. Basic
U-value calculation.

WT4405 WOOD TECHNOLOGY 2

Rationale And Purpose Of The Module:
To introduce the student to wood protection
and finishing technology in respect of wood
and wood based materials.

Syllabus:
Analysis of factors governing the weathering
of wood based materials - chemical, colour
and physical changes. Preservatives - analysis
of factors governing their selection and
application. Surface finishing - analysis of
factors governing selection and application of
the finishing agent.

WT4503 STRUCTURAL MECHANICS

Rationale And Purpose Of The Module:
To develop the student’s understanding of:
* force systems
* criteria for structural design
* structural behaviour

Syllabus:
SI units and manipulation of formulae, sources
and types structural loading, reactions and
supports, free body diagrams, shear force
and bending moment calculations, static
determinancy and indeterminancy, qualitative
analysis of beams and frames, stability
and analysis of pin jointed frames, section
properties, engineers equation of bending.

These topics will be covered through lectures,
tutorials, experimentation and problem solving
projects.

WT4505 BUILDING ECONOMICS

Rationale And Purpose Of The Module:
The overall aim of this module is to illustrate
the application of economic principles to the
building and construction process.

Specific objectives include providing the
student with:
* An overview of the construction industry
and its role in the economy
* An understanding of the construction
firm and its management from an economic
perspective
* The economic considerations in evaluating
building projects and making decisions.

Syllabus:
The construction industry, its economic
development, structure and role in the
economy, construction as a production
process. Management of firms, costs,
revenues and markets from the point of
view of economists and managers. strategic
decision making in property development
and project appraisal and feasibility studies.
Linking the economics of the production
process of construction to the economics of its
output, buildings and structures of the built
environment. Cost modelling techniques, cost
and price forecasting, cost product and process
modelling, dealing with uncertainty. Building
design, its interaction with the construction
process in determining the cost and quality of
buildings. The economics of buildings essential
resources, energy efficiency and its cost. Cost
limits and values, determining value for money
Commercial values and the property market.
WT4507 FORENSIC ENGINEERING AND ETHICS

Rationale And Purpose Of The Module:
This module introduces the important subject of ethics through the study of engineering failures. Well-documented case studies, project work and invited speakers form an intrinsic part of achieving the following key objectives:

* To promote ethical behaviour throughout the students’ personal, university and professional lives.
* To demonstrate the value of learning from engineering failures.
* To emphasise the scientific method in engineering practice.
* To produce good citizens.
* To emphasise the importance of effective communication.

Syllabus:
Reasons for failures in engineering; Modes of failure; Risk; Failure case histories in concrete, steel, masonry, foundations and timber etc; Common pitfalls, Feld’s ten basic rules; Nonstructural failures; Learning from failures; Forensic engineering practice; Conducting a forensic engineering investigation; Writing a forensic engineering report; Ethics and Responsibilities, Standard of Care; Rules of evidence, Depositions, Arbitration.

These topics will be addressed through PBL exercises involving individual and/or team challenges. The module assessment is by 60% CA work and 40% end of semester examination. Examples of CA work include class debates (e.g. cases involving ethical dilemmas faced by engineers such as Citicorp building N.Y.), individual online quizzes on ethics, individual online quizzes on forensic engineering, team based forensic engineering projects requiring presentations and report writing.

Cross faculty collaboration on projects involving law and architecture is also encouraged on this module.

WT4605 PROCUREMENT AND CONTRACTING

Contract building blocks, forms and essential elements of contracts, partnering and new developments forms, buyer-seller relationship. Invalidity factors and frustration, agreements, conditions and warranty, liquidated damages, performance bonds and terms of payments.

The procurement process, tendering and bidding, tender evaluation and awarding of contracts, uncertainty and risks, negotiations legislative restrictions. eProcurement, centralised purchasing within organisations.

Contract administration, claims and disputes, legal procedures, conciliation & arbitration. Managing conflict and negotiating procedures. Contract closure, compliance, maintenance periods, commissioning, payment structures and final accounts.

WT4707 CONSTRUCTION TECHNOLOGY AND MANAGEMENT 3

Rationale And Purpose Of The Module:
The aim of this module is to provide an understanding of overall project management process and principles and how they apply to construction projects

Syllabus:
* Introduction to Construction Project Management and PM Software - purpose, concepts and conventions.
* Construction Planning Tools and Techniques û Schedule Definition and Management; Construction Project Network Analysis, Critical Path, PERT & Line of Balance.
* Resource Allocation & Levelling û labour, material and equipment
* Site Establishment and Management
* Managing Resources and Costs
* Communications & Change Control Management - Site Meetings and Progress Reports
* Leadership and Negotiation Skills on Construction Projects
* Construction Risk Management û Identification, Analysis, Response and Control
* Construction Productivity Improvement - Define, Measure, Analyze, Improve and Control

Faculty of Science and Engineering
CHEMICAL & ENVIRONMENTAL SCIENCE

BC4401 INTRODUCTION TO INDUSTRIAL BIOCHEMISTRY (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6

Genetic information and Genetic Engineering; overview of approaches and applications. DNA fingerprinting; applications of fingerprinting to forensic science, edigree analysis and paternity testing. The Human Genome Project and its impact on society; the cloning of mammals and mammalian body parts. Human cloning. The Biochemistry of HIV; viral structure and biology. Biotechnical approaches to developing a cure/vaccine. Prion biology; BSE and CJD. Dangerous microbes; concept of mobile DNA. Molecular biology of cancer; oncogenes and cellular transformation. Biotech strategies to cure cancer. The approach to research; case studies; identification of a problem, planning and pursuing a research strategy. Evaluating the results. Pharmaceutical biology and biotechnology; approaches to drug discovery; the discovery of aspirin, antibiotics and taxol. Products of pharmaceutical biotechnology and their medical uses. Gene medicines; gene therapy. Life at the extremes; the unique biology of hyperthermophiles. Biological warfare.

BC4803 MICROBIAL TECHNOLOGY I (AUTUMN/1)
7 hours per week; 13 weeks/3rd semester; 26L/26T/39LAB; ECTS credits: 6

The prokaryotic and eukaryotic micro-organism; systematics in microbiology; industrial micro-organisms; mycology; processes mediated by fungi; industrial mycology; introduction to viruses; microbial ecology; GEMs’ control of microbial activity. Prerequisite BY4001

BC4825 MICROBIAL TECHNOLOGY A
Rationale And Purpose Of The Module:
To build on the fundamental concepts of microbiology. To develop skills in manipulating and identification of microorganisms. To develop an understanding of metabolic pathways. Understanding basic concepts in microbiology for the development of diagnostic kits. To illustrate the role of microbiology in the clinical and food environment. Understand viruses and their life cycles.

Syllabus:

BC4903 BIOCHEMISTRY 1 (BIOMOLECULES) (AUTUMN/1)
7 hours per week; 13 weeks/3rd semester; 26L/26T/39LAB; ECTS credits: 6

Gene structure, function and control; techniques to manipulate DNA; DNA transfer methods; polymerase chain reaction; cDNA; northern, southern and western blotting; cloning in plants and animals; introduction to bioinformatics; gene therapy. Prerequisites BC4903/BC4904

CG4005 CHEMICAL ENGINEERING THERMODYNAMICS

Syllabus:
Application of the first and the second law of thermodynamics in chemical engineering: identify and describe open and closed systems; conditions and limitations for conversion between different kinds of energy; describe the theoretical energy conversion processes of Carnot-, Rankine- and Brayton, and understand the differences with their corresponding technical applications: steam turbines, gas turbines, cooling machines and heat pumps. Fundamental thermodynamics of phase equilibria and methods of correlation and prediction: understand standard states and the use of activity and fugacity coefficients, understand the use and limitations of models for correlation and prediction of excess free energy and activity coefficients

Application of chemical thermodynamics to reaction engineering: spontaneity of chemical reactions, chemical reaction equilibrium, equilibrium conversion calculations
Methods of correlation and prediction of physical properties for chemical engineering calculations. Availability and application of electronic data bases for physical properties, and software for prediction of physical properties.

CG4007 SUSTAINABLE ENERGY PROCESSES

Rationale And Purpose Of The Module: Provision of a process engineering module to give a deeper and wider knowledge in energy processes, with emphasis on sustainability and renewability.

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

CG5031 CHEMICAL ENGINEERING DESIGN METHODS 1

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

CG5042 CHEMICAL ENGINEERING DESIGN METHODS 2

Rationale And Purpose Of The Module: To provide the student with a comprehensive training in mechanical design for chemical processing operations. To give the students a starting knowledge in the design of unit operations, subsystems design and design of complex processes. To develop knowledge and skills in the application of process optimisation and energy integration techniques. Mechanical Design of Unit Operations is a key skill of the Chemical Engineer. The purpose of this module is to develop mechanical engineering design skills related to the selection and integration of pumps, valves, piping networks, pressure vessels and heat exchangers into a process design.

CH4001 CHEMISTRY FOR ENGINEERS

3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6


CH4003 PHYSICAL CHEMISTRY 2

To facilitate the student in understanding of the reaction thermodynamics and the role of thermodynamics in chemical reaction processes. ii. To familiarise the student with the various reaction kinetics, including some complex kinetic schemes, their interpretation and applications in the appraisal of industrial problems. iii. To develop the students ability to design basic kinetic experiments and to extract kinetic information from the measurements of concentration-time based data. iv. To provide the student with the basic knowledge of commonly used spectroscopes.

CH4005 PHYSICAL CHEMISTRY 4

To familiarise the student with the concepts of electrochemical systems under current flow situations. To familiarise the student with electrochemical methods of chemical analysis. To introduce the area of large scale electrochemical technology.
CH4007 ORGANIC PHARMACUTICAL CHEMISTRY 1

To build on the functional group chemistry covered in CH4102, CH4103 and CH4104. To impart to the student a detailed understanding and working knowledge of the applied use of organic compounds as pesticides and as medicinal drugs with an emphasis on mode of action at the molecular level and on the synthesis of selected structures.

CH4013 ORGANIC CHEMISTRY

Rationale And Purpose Of The Module:
To introduce the student to fundamental aspects of organic chemistry eg the different families of compounds- their nomenclature, structure (2D and 3D) and isomerisation (if any).
To highlight the functional group of each family and relate structure to reactivity; to examine associated reactions/reaction mechanisms of the different functional groups; to introduce aromatic chemistry and study the chemical behaviour of aromatic compounds; to highlight current trends and applications in the areas of organic chemistry.
To carry out practical work to support and reinforce some of the theoretical aspects encountered; to encourage self-directed learning through the use of software and web sources.

Syllabus:
Aliphatic Hydrocarbons, Haloalkanes, Alcohols/Ethers, Aldehydes/ Ketones, Carboxylic Acids and Carboxylic Acid Derivatives, Amines, Aromatic Hydrocarbons.

CH4105 ORGANIC CHEMISTRY 4

Rationale And Purpose Of The Module:
To describe the main methods of polymer production relating synthesis detail to chain architecture. To explain the molecular basis of structure-property relationships in polymers. To develop an understanding of the structure and function of proteinaceous biopolymers.

Syllabus:

CH4020 ANALYTICAL CHEMISTRY 1A

To give the students an understanding of and an appreciation for the qualitative and quantitative aspects of analytical chemistry through a working knowledge of the theory and applications of spectrophotometry and spectroscopy.

CH4305 ANALYTICAL CHEMISTRY 3

APPLICATION OF X-RAY METHODS INCLUDING DIFFRACTION, FLUORESCENCE AND ELECTRON MICROPROBE ANALYSIS. STRUCTURE DETERMINATION BY X-RAY METHODS, SOLID STATE REACTIONS INCLUDING CORROSION AND CEMENT CHEMISTRY; RELATIONSHIP BETWEEN CHEMICAL AND MECHANICAL PROPERTIES, APPLICATION OF GROUP THEORY, INCLUDING POINT AND SHAPE GROUPS, [Surface Analysis], STM/AFM, LEED, XPS, AES, gas adsorption methods-BET, etc. REVIEW OF ALL MAJOR CLASSES OF SOLIDS * CRYSTALLIZATION-NUCLEATION AND GROWTH OF CRYSTALLINE SOLIDS * POLYMORPHISM IN PHARMACEUTICAL SOLIDS * ELUCIDATION OF THE STRUCTURE OF DNA * LACTOSE CRYSTALLIZATION * POLYMERS * SOLID STATE TRANSFORMATIONS * NON-STOICHIOMETRY AND SOLID SOLUTIONS * IONIC CONDUCTIVITY IN SOLIDS-SOLID STATE SENSORS * TOPOTACTIC REACTIONS AND EPITAXY

Faculty of Science and Engineering

CHEMICAL & ENVIRONMENTAL SCIENCE


Physical Chemical principles of dosage from design Particle science & powder technology Biopharmaceutics Dosage form design & manufacture

will be examined. (c)Physics Coverage and application to Nursing and Midwifery of selected aspects of matter, gravity, motion, pressure, heat, light, electromagnetic spectrum; including UV and X-rays, radioactivity, diagnostic radiology, ECT.

**CH8012 FUNDAMENTALS OF NANOSCIENCE AND NANOTECHNOLOGY**
(No description available)

**ER4001 ENERGY AND THE ENVIRONMENT**

**Rationale And Purpose Of The Module:**
To draw upon core scientific module of the program e.g, thermodynamics while exposing students to the local, regional & global environmental effects that arise from the generation and use of energy.

**Syllabus:**
Energy Resources & Supply
Thermodynamics of energy conversion
Electricity generation & storage
Fossil fueled power generation
Transportation
Clean Technology for energy generation and transmission
Nuclear power generation

**ER4101 SYSTEMATIC ENVIRONMENTAL SCIENCE**
(AUTUMN/1)
3 hours per week; 13 weeks/1st semester;
26L/13T; ECTS credits: 6

Ecosystem functioning; environmental monitoring; environmental technology.

**ER4304 GEOSCIENCE**

**Rationale And Purpose Of The Module:**
To provide environmental sciences with important information and understanding of aspects of the physical environment, namely climate, climate change and groundwater. To provide an understanding of current technologies, namely remote sensing and geographical information systems. To provide geography students with information and understanding of physical geography relevant to second level teaching.

**Syllabus:**
Structure of the atmosphere; insolation; general circulation models; global climatic zones; mid-latitude weather and climate; stability, cloud formation and precipitation; causes and effects of polar vortices; climatic change in past and predicted future; natural and anthropogenic causes of climate change; groundwater formation, distribution, uses, causes of pollution; vulnerability to pollution; remote sensing: energy sources, emittance and reflection, impacts of atmospheric transmission on electromagnetic radiation; spectral reflectance; data capture and interpretation; application of remote sensed data; Geographical Information Systems: methods and applications.

**ER4405 CONSERVATION ECOLOGY**
(AUTUMN/3)
4 hours per week; 13 weeks/5th semester;
26L/26LAB; ECTS credits: 6

Legislation; governmental and other agencies; Selection of areas for conservation; theory and practice of management for conservation; habitat rehabilitation and creation.

**ER4407 ENVIRONMENTAL MANAGEMENT 1**
(AUTUMN/4)
3 hours per week; 13 weeks/7th semester;
26L/13T; ECTS credits: 6

The relationship between economic development and the environment: the evolution of the concept of environmental management; and global analysis of the contemporary environment; the interaction between nature, society and enterprise; resources, technology and management.

**ER4417 ENVIRONMENTAL IMPACT ASSESSMENT**
(AUTUMN/4)
3 hours per week; 13 weeks/7th semester;
26L/13T; ECTS credits: 6

Selection of topical project; scoping, alternatives, baseline data criteria, assessment of impact, mitigating measures, contingency measures, public involvement, EIS production. Prerequisite ER4707

**ER4438 ENVIRONMENTAL FATE MODELLING**

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

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

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

**Syllabus:**
[Introduction to transport and degradation of chemicals in the environment]
[Air] Sources - Source Parameters - Meteorology - Buoyancy - Topography -
**CHEMICAL & ENVIRONMENTAL SCIENCE**

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Gaussian Mathematics - Deposition  
[Surface Water] Source - Source Parameters  
- River Hydrogeometry - Dispersion - Mixing  
- Flow Depth & Velocity - Diffusion  
[Groundwater] Hydraulic conductivity - Gradient - advection - diffusion  
Bioaccumulation - Biodegradation - Analysis of Rate Data - 0, 1st, 2nd Order - Integral method  
[Environmental Fate Scenarios] - Screen3 model application - computer laboratory

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**ER4507  EFFLUENT CONTROL - WASTE MANAGEMENT 1 (AUTUMN/4)**  
3 hours per week; 13 weeks/7th semester; 26L/13T; ECTS credits: 6

Principles of waste water management; effects of waste on receiving water sites and groundwater; pollutant tests; legislation; technology of waste water treatment and disposal; biological treatment of waste water; biological kinetics: activated sludge, trickling filter; sludge disposal; tertiary/advanced process; waste water reclamation.

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**ER4708  BIOMETRICS (AUTUMN/4)**  
4 hours per week; 13 weeks/8th semester; 26L/26LAB; ECTS credits: 6

Hands-on experience at analysis of community ecology data; detailed consideration of the problems encountered in taking the data from field observations, encoding, options for in put to computer packages, preliminary explorative statistics, multivariate options: dendrograms, TWINSPAN, correspondence analysis, canonical correspondence analysis CANOCO.

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**FS2101  SCIENCE FOUNDATION 1**

On completion of the module the student will:  
Demonstrate a basic knowledge and principles of biology, chemistry and physics. Understand the connection between all three disciplines.  
**Syllabus:**  
a) Biotechnology  
The structure of the living cell. The significance of the compartments of the cell. The chemistry of the biomolecules; proteins, nucleic acids, carbohydrates and lipids, will be explained. Photosynthesis and Respiration. The organization of the whole organism.  
b) Chemistry  
Students will be familiarized with simple treatment of chemical concepts and principles. This will include coverage of aspects of atoms, molecules, bonding, the periodic table. Chemical nomenclature. Simple chemical reactions, acids, bases, pH.

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**ER4627  SAFETY AND INDUSTRY**

**Rationale And Purpose Of The Module:**  
To provide an understanding of the principles of accident causation and prevention in the workplace.

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**ER4707  MONITORING AND RESEARCH METHODS (AUTUMN/4)**  
5 hours per week; 13 weeks/7th semester; 26L/13T/26LAB; ECTS credits: 6

Environmental impact assessment its role in the management of projects; scoping; data collection; impact assessment; impact evaluation; the environmental impact statement; interaction with the wider community; strategic environmental assessment; sea with regard to the energy sector, coastal zones; monitoring of emissions, including noise; environmental auditing; collection and encoding of data; multivariate approaches.

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**HS3101  LEGISLATION**

**Rationale And Purpose Of The Module:**  
To provide an understanding of the operation of the Irish legal system and to understand the connection between common law and statute law and appreciate the manner in which law relating to occupational safety and health has developed through case-law in the Irish Courts.

**Syllabus:**  
HS3201 RISK MANAGEMENT/SAFETY TECHNOLOGY

_Rationale And Purpose Of The Module:_
To identify physical and chronic hazards in the workplace and to demonstrate the means of reducing the risk of injury and loss.
To explain the models of accident causation.
To familiarise students with the concept of job safety analysis, safe work systems and safety audits.
To provide students with a framework for accident investigation.
To familiarise students with the procedures involved in risk assessment and the preparation of a safety statement.
To provide a theoretical understanding of the value of safety training and the techniques available.
To familiarise students with Hazop and Hazan.

HS4003 OCCUPATIONAL HYGIENE 1

_Rationale And Purpose Of The Module:_
To familiarise the student with a broad range of occupational hygiene issues currently pertinent to the workplace environment.
To further develop the students’ awareness of the occupational hygiene approach to hazard recognition, evaluation, monitoring and control in respect of selected chemical and physical hazards.
To enhance the students skills in the use of appropriate measuring equipment and evaluation of findings in the context of occupational exposures.

HS4107 OCCUPATIONAL HEALTH

_Rationale And Purpose Of The Module:_
To provide students with an understanding of how occupational health fits into the overall safety management structure.
To facilitate students in identifying possible causes of occupational ill-health in the workplace and provide the student with a basic understanding of how occupational ill-health can be investigated.
To provide the student with a strong appreciation of the role of medical testing in the workplace including screening, health surveillance, sickness and absence.
To be aware of when to call in specialist medical, health & welfare professionals.
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;

CS4006 INTELLIGENT SYSTEMS

Rationale And Purpose Of The Module:
The purpose of this module is to familiarise students with a targeted subset of the principles and methods of Artificial Intelligence and Intelligent Systems. Given that students from a number of programmes will be taking this module, examples and projects work will be relevant to each group of students in so far as possible.

Syllabus:
To provide students with an understanding of the basic principles, methods and application domains for Artificial Intelligence. To introduce students to the development of Intelligent Systems, Knowledge Representation, and Machine Learning. This module introduces the history and development of Intelligent system concepts. It includes discussions on AI and Expert Systems, Heuristic Search, Evolutionary Algorithms, Artificial Neural Networks, Cognitive Science, and issues in representation, reasoning and machine learning, together with a set of design principles for intelligent autonomous agents. Real world applications of the course topics are also presented in areas such as robotics and financial prediction.

CS4007 INFORMATION SOCIETY 2 (CSI 2-1-0)

This course offers a socio-economic, political and cultural exploration of the “internet society”. The course will provide a series of perspectives on the network society, examining its conceptual foundations, critiquing its more polemical exponents, and subjecting the claims of the electronic sublime to critical scrutiny. The course will help students understand some of the current debates in the media about the effects of information and communications technology on society. Brief syllabus: the course will examine the claims of those who argue for the emergence of a radically new Information Society, as against those who see the emerging society as being fundamentally a continuation of existing socio-economic forces; the differing perspectives of technological determinism and social determinism will be examined; the notion of “information ecologies” will be examined, as well as the current debate about the “knowledge society”.

CS4076 EVENT DRIVEN PROGRAMMING

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.

CS4084 MOBILE APPLICATION DEVELOPMENT

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

Syllabus:
- Challenges to be faced when developing applications for mobile devices.
- Platform specific mobile applications and/or mobile web applications; mobile application lifecycles.
- Mobile applications and their architectures.
- Overview of operating systems (OSs) and Application Programming Interfaces (APIs) to choose from when developing applications for mobile devices.
- Comparison of native development environment options; software development kits (SDKs) and emulators.
- Installing and configuring the development environment.
- Managing application resources; designing user interfaces; data storage and retrieval options; synchronization and replication of mobile data.
- Communications via network and the web; networking and web services; wireless connectivity and mobile applications.
- Performance consideration: performance and memory management; performance and threading; graphics and user interface performance; use various facilities for concurrency.
- Security considerations: encryptions, authentication, protection against rogue applications.
- Location based application; location API.
- Packaging and deploying applications for mobile devices.

CS4115 DATA STRUCTURES AND ALGORITHMS

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

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

CS4416 DATABASE SYSTEMS

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

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

CS4911 INTRODUCTION TO INFORMATION TECHNOLOGY

This module is designed to give 1st and 2nd year students from disciplines other than Computing a historical and theoretical
introduction to information technology: concepts, terminology and possible future developments; together with practice in standard productivity software. - Concepts of information technology. - Data and information. - Software: general purpose applications, operating systems features, programming development languages, HTML; proprietary software and Open Source Software. - Hardware: types of computers, input/output devices, CPU, memory and secondary storage û disks and solid state memory. - Development of the PC. - Communications and connectivity: modems, communications channels, networks: LAN, WAN. - The Internet and the Web: access, browsers, URLs, search engines, multimedia. - 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.
PT4423 2D CAD

Rationale And Purpose Of The Module:
2D CAD drawings are vital to the communication of engineering design information. 2D CAD generated drawings are used in such diverse areas as architectural design, mechanical part design, facilities layout, service and circuit diagrams and technical publications. This module introduces students to the concepts, principles and techniques of 2D CAD drawing and design using AutoCAD. The adoption of best practice strategies for the efficient and effective use of CAD for creating, editing and viewing geometry as part of the design process are stressed throughout the module.

Syllabus:
Contemporary CAD software with particular reference to AutoCAD; hardware, software and operating systems; the AutoCAD drawing environment: absolute and relative coordinates, units and limits; CAD tools and drawing setup; drawing templates; the UCS; basic and advanced drawing and editing commands; introduction to layers; creating and using blocks Wblocks, attributes and symbol libraries; communicating engineering and design details; dimensioning and dimensioning styles; text styles; tolerated dimensioning; sectional views and hatching; tool palettes; Paper Space layouts; customisation techniques; customising toolbars and toolbar macros; isometric drawing. CAD construction techniques; plotting; sheet sets; raster images, multilines; using DesignCenter; DWF drawings; Introduction to 3D geometry.

PT4121 COMMUNICATION GRAPHICS

Rationale And Purpose Of The Module:
This module provides an introduction to the fundamentals of the universal language of engineering, design and technology. The essential conventions, principles and concepts of the graphic language are explored through visualising and solving problems using a combination of freehand sketching and manual drawing communication techniques. The visualisation and graphic skills developed are essential prerequisites for 2D and 3D CAD.

To promote and nurture spatial-visualisation and spatial-reasoning abilities critical to the success of technology professionals.
To present the standards and conventions of engineering drawing essential to the correct creation and interpretation of graphical representation used in engineering communication and documentation.
To foster manual drawing skills, especially sketching, which are essential to design and communication success.

PT4427 DESIGN FOR MANUFACTURE

Rationale And Purpose Of The Module:
To introduce the student to the science and art of New Product Development. It links the manufacturing and construction skills learnt in earlier modules with the design process and these are brought together by means of a project. The project is intended to take the student through the basic design process into requirements engineering, market analysis, materials, manufacturing processes and the production of an initial business plan.

PT4213 DRAWING AND CAD

Rationale And Purpose Of The Module:
To introduce the standards, conventions and projection systems used to communicate design information.
To develop the students technical communication abilities
To introduce students to the principles and concepts of parametric solid modelling using SolidWorks.
To introduce students to best practice sketching, modelling and assembly strategies for design intent as part of the design process.

PT4011 INTRODUCTION TO TECHNOLOGY MANAGEMENT

Rationale And Purpose Of The Module:
The purpose of this module is to introduce students to the concept of Technology Management and in doing so to provide them with an understanding of what they will be studying during their 4-year degree and why it is relevant. This module will provide students with a framework for understanding technology management activities and tools. The module will examine how firms acquire, exploit and protect technology resources. Students will be introduced to a set of tools that can be used in managing technology. Many of the concepts introduced in this module will be explored in greater detail in future modules.

PT4015 LEAN THINKING AND LEAN TOOLS

Rationale And Purpose Of The Module:
To introduce the main elements of the Lean process improvement framework, focusing on quantity control and human engagement, through lectures, readings and laboratory experience.
To prepare students to engage in performance improvement projects.
PT4111 MANUFACTURING TECHNOLOGY 1

Rationale And Purpose Of The Module:
To provide the student with a basic knowledge and experience the properties of engineering materials and how they are processed and fabricated.
To emphasise the importance of safety in the engineering environment.
To provide the student with the knowledge to select an appropriate material for the manufacture of an engineering component or structure.

DM4003 OPERATIONS MODELLING

Rationale And Purpose Of The Module:
Understand the role of operations in both production and service enterprises.
Introduce Lean thinking and structured operations improvement tools.
Introduce a range of quantitative methods and highlight their application in the decision making process for solving real world problems.
Provide an understanding of optimal decisions under constraints.
Provide an understanding of design and analysis of operations under uncertainty.
To provide students with modeling and software capabilities that can be applied to operations design and analysis.

PT4007 PLAN WITH DESIGN CHAINS

Rationale And Purpose Of The Module:
The centrality of planning activity is established in the context of the Supply-Chain Operations Reference Model (SCOR).
Planning incorporates anticipation represented here by Forecasting and making optimal decisions about capacity of supply, storage, production, delivery and enabling processes, and about how to integrate and deploy this capacity optimally in terms of performance and cost trade-offs within the confines of limited resources.

PT4315 PRODUCTIVITY METHODS 3

Rationale And Purpose Of The Module:
Focusing on integration and organisation of work (‘point’ work has been dealt with in a prior work design module), covering three main domains: production control at its lowest level - the scheduling/dispatching domain; its integration through the layout domain; and its implementation through the project planning and control domain. There is an overall emphasis on performance, generating alternative innovative solutions, evaluating them and selecting the more appropriate.

PT4317 PRODUCTIVITY METHODS 4

Rationale And Purpose Of The Module:
To develop students formal planning capability in optimisation domain within context of production planning and resource utilisation and performance

Syllabus:
LP is vehicle for optimisation (Taha), proceeding to stochastic simulation (Simul8 demo)and heuristic based line balancing, and dual-objective stochastic tradeoffs demonstrated by simple variability- utilisation-time queuing models (Hopp and Spearman).
Mathematical level appropriate to BSc. Breadth appropriate to underpin scientific process improvement practice.

PT4025 SIMULATION MODELLING AND ANALYSIS

Rationale And Purpose Of The Module:
To provide students with knowledge on discrete event simulation modeling and its application to manufacturing, logistic and services systems.
To provide students with modelling and software capabilities to apply simulation to manufacturing, logistic and services systems.

PT4005 SUPPLY CHAIN DESIGN

Rationale And Purpose Of The Module:

PT4031 SUPPLY CHAIN MANAGEMENT STRUCTURES
(No description available)

PT4021 SUPPLY CHAIN OPERATIONS MANAGEMENT
(No description available)

MF4713 WORK DESIGN AND MEASUREMENT

Rationale And Purpose Of The Module:
The purpose of this module is to develop a fundamental conceptual basis and frame of analysis for designing and improving physical work methods. These should aim towards the goals of jointly optimal deployment of resources and of treatment of the object of the work, thereby contributing to competitive cost and performance effectiveness goals, using a scientific approach grounded in observation, modelling and prediction.
The proposed frame supports analysis of work methods, synthesis and evaluation of proposed
alternatives, and choice and specification of optimal configurations.
The module is set in the idiom of manual human tasks, and at work-unit level of granularity, partly as this makes use of tractable and engaging laboratory demonstration, and mainly as it forms a useful starting point for subsequent extension to the larger canvas of design, operation and improvement projects on whole systems of work, as seen in engineering activities such as layout/location, scheduling, etc.
ELECTRONIC & COMPUTER ENGINEERING

CE4205 MICROCOMPUTER SYSTEMS  
(AUTUMN/3)  
4 hours per week; 13 weeks/5th semester;  
26L/26LAB; ECTS credits:6

Overview of the 8086 architecture including, memory and I/O mapping,  
memory segmentation, interrupt structure, the  
components of the standard PC base on the  
8086 processor; the programmers model for  
the 8086, instruction set, addressing modes,  
8086 assembly language programming tools;  
operating system introduction; definitions,  
components command shells, services overview; MS-DOS memory organisation,  
extended and expanded memory; interrupt  
handlers, BIOS and DOS functions; device  
drivers; concept, designing applications;  
disk storage organisation; disk structures,  
file and directory structures, performance  
considerations; introduction to micro-soft  
windows 3.1; implementation as an extension  
of DOS, memory organisation, simple co-
operative multi-tasking features.

CE4607 COMPUTER NETWORKS  
(AUTUMN/4)  
3 hours per week; 13 weeks/7th semester;  
26L/13T; ECTS credits:6

The course incorporates: communications within and between computer systems,  
switching and routing protocols, distributed network architecture’s incorporating application oriented protocols and standards.

CE4701 COMPUTER SOFTWARE 1  
(AUTUMN/1)  
4 hours per week; 13 weeks/1st semester;  
26L/26LAB; ECTS credits:6

Outline structure of a digital computer; the role and use of the operating system; computer applications software; language hierarchy; Algorithms and problems solving; structuring complex problems, the subprogram concept; Arrays; Input and Output; Disk files.

CE4703 COMPUTER SOFTWARE 3*  
(AUTUMN/2)  
4 hours per week; 13 weeks/3rd semester;  
26L/26LAB; ECTS credits:6

Advanced C language programming; structures; dynamic memory management; separate compilation; modules; header files; linkage; variables, access and scope; data abstraction in C; error handling; recursion; algorithm performance analysis; order notation; sorting arrays of objects; sorted array searching; data structures and abstract data types (ADTs); hashing; data design and selection of data structures.

CE4706 SOFTWARE ENGINEERING 1  
Rationale And Purpose Of The Module:  
- To introduce the domain of software engineering from a programmers perspective focusing on object oriented analysis, design and programming.  
- To revisit and develop existing computer software skills and competence.  
- To emphasise good Software Engineering Practices  
- To enhance individual and team working skills

Syllabus:  
Introduction to Software Engineering.  
Software Development Paradigms.  
Software Evolution and Reliability.  
Human Factors in Software Engineering.  
System Modelling.  
Requirements Definition/Specification.  
Software Design: Modularity, Cohesion, Coupling.  
Function Oriented Design.  
Diagramming Techniques.  
Structured Design.  
Software Reviewing and Testing.  
Software Quality Assurance and metrics.  
More ADTs and algorithms.  
Introduction to Object Oriented Analysis/Design and Programming Languages Programming Practice: Coding, Style, Documentation.  
Development Environments: Debuggers, Profilers, Browsers.  
Individual and Team Project/Case Study.

EE4003 THE ENGINEER AS A PROFESSIONAL

3. The Engineer as a Professional.  
4. Engineering Ethics, Engineers in Society, Responsibility in Engineering, Common Morality & Codes of Ethics, Analysing the Problem, Utilitarian & Respect for Persons Philosophies, Creative Middle Ways

EE4005 ELECTRICAL POWER SYSTEMS

Generators/Alternators in power systems:  
steady state operation, transient conditions, unbalanced loading or faults, operation connected to infinite/non-infinite busbars, stability margin, operational limits, operation at leading power factor, governors and frequency control.  
Power Factor Correction: Single-phase and three-phase power factor correction.  
Utility and consumer power factor correction.  
Active power factor correction and filters.  
Voltage Regulation: Voltage control standards: methods of voltage control, generator, reactive injection, series compensation, tap-changing, coordination of voltage regulation, voltage control and reactive power.  
Three-phase Transformers: Review of power transformers, construction,

EE4015 ELECTRICAL POWER SYSTEMS


EE4023 DISTRIBUTED SYSTEMS
(No description given)

EE4027 TELECOMMUNICATION NETWORK ARCHITECTURES I
(No description given)

EE4115 SYSTEMS ANALYSIS
(AUTUMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits: 6

Bode plots; poles and zeros; Laplace transform, application to circuit analysis, frequency response from pole-zero locations; computer simulations; second-order systems; Fourier series; filter design; Butterworth, Bessel, Chebyshev. transmission line introduction; properties of selected lines.

EE4207 INDUSTRIAL AUTOMATION

Motion Control: Open Loop and Servos/Closed Loop Electric motors, drives and controllers. Steppers, DC Servos, Brushless Motors. Motion sensors / transducers for servo operation, tachometers, optical encoders, resolvers, Pneumatics Electro Pneumatics, valves, pneumatic devices, pneumatic control systems. Programmable Logic Controllers PLCs, industrially hardened modular controller, programming. Mechanical System Components and Considerations Friction, low friction designs, inertia matching, gear boxes, screws, worms, toothed belts, harmonic drives. Choice of motor system to match speed, accuracy, stiffness, efficiency requirements etc. Industrial Robots Classification; robot programming, forward and inverse kinematics, sensor systems integration, challenges of mobile robotics

EE4313 ACTIVE CIRCUIT DESIGN 1
(AUTUMN/2)
5 hours per week; 13 weeks/3rd semester; 26L/13T/26LAB; ECTS credits: 6

Overview; diodes. Mosfets: JFETs: BJTs: IC components overview: BJTs Mosfets; biasing methods: small-signal models; amplifier types; differential; systems overview.

EE4207 INDUSTRIAL AUTOMATION

Motion Control: Open Loop and Servos/Closed Loop Electric motors, drives and controllers. Steppers, DC Servos, Brushless Motors. Motion sensors / transducers for servo operation, tachometers, optical encoders, resolvers, Pneumatics Electro Pneumatics, valves, pneumatic devices, pneumatic control systems. Programmable Logic Controllers PLCs, industrially hardened modular controller, programming. Mechanical System Components and Considerations Friction, low friction designs, inertia matching, gear boxes, screws, worms, toothed belts, harmonic drives. Choice of motor system to match speed, accuracy, stiffness, efficiency requirements etc. Industrial Robots Classification; robot programming, forward and inverse kinematics, sensor systems integration, challenges of mobile robotics

EE4313 ACTIVE CIRCUIT DESIGN 1
(AUTUMN/2)
5 hours per week; 13 weeks/3rd semester; 26L/13T/26LAB; ECTS credits: 6

Overview; diodes. Mosfets: JFETs: BJTs: IC components overview: BJTs Mosfets; biasing methods: small-signal models; amplifier types; differential; systems overview.
EEE4407  ASICS 1 (AUTUMN/4)
5 hours per week; 13 weeks/7th semester;
26L/13T/26LAB; ECTS credits:6

Introduction to Design Methodologies; UNIX; VLSI structures; design entry and simulation; hardware description languages; design for text. Prerequisite EEE4407

EE4513 DIGITAL SYSTEMS 3* (AUTUMN/2)
4 hours per week; 13 weeks/3rd semester;
26L/26LAB; ECTS credits:6

Classical von Neumann model. The basic microprocessor; Addressing modes: data movement instructions; the assembler and assembler directives; arithmetic and logic instructions; program control: processing text; stacks; cross-linking. Perquisite EE4512

EE4607 TELECOMMUNICATION SYSTEMS 1 (AUTUMN/4)
3 hours per week; 13 weeks/7th semester;
26L/13T; ECTS credits:6

Introduction to Communication Systems; transmission, T1-digital Carrier, Switching, Signalling, Local Loop, Inter-exchange signalling; mobile Communications, GSM, DECT, DCS-1800 UMTS; satellite communications, DBS, LEO’s GPS; future of Telecommunications Systems

ET4003 ELECTRO TECHNOLOGY
Rationale And Purpose Of The Module:
This module provides an introduction to electrotechnology for students studying in the area of enterprise engineering, materials and construction.
Prerequisite EE4407

ET4008 TEST ENGINEERING 2:
DIGITAL CIRCUIT AND SYSTEM TEST
Rationale And Purpose Of The Module:
The increasing complexities and speed of operation of modern digital circuits and systems is increasing the demand on product testing. The purpose of the module is to introduce the students to modern semiconductor integrated circuit (IC) test methods, including automatic test equipment (ATE), design for testability (DfT) and built-in self-test (BIST) for digital ICs.

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

ET4013 Communications Engineering Fundamentals
Rationale And Purpose Of The Module:
The aim of this module is to provide an introduction to data communications and networking. The module includes an overview of essential foundation topics and also introduce students to the interworkinging principles and concepts.

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

ET4015 - TEST ENGINEERING 1:
PRODUCT DEVELOPMENT AND ATE SYSTEMS
4 hours per week; 13 weeks/1st semester;
26L/26LAB; ECTS credits:6

**ET4017 COMMUNICATIONS NETWORKING Standards**

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

**Syllabus:**
Personal Area Networks (PANs): Bluetooth, IEEE 802.15 standard.
Local Area Networks (LANs): Medium Access Control (CSMA/CD vs. CSMA/CA); logical link control (LLC), IEEE standards: 802.3/1/2/3/4/5/6/7/8 (ethernet), 802.5 (token ring), 802.11 (WiFi), 802.1Q (VLAN).
Metropolitan Area Networks (MANs): IEEE 802.16 (WiMax) standard.
Wide Area Networks (WANs): Frame relay: Asynchronous Transfer Mode (ATM); Multi-Protocol Label Switching (MPLS); Integrated Services Digital Networks (ISDN).
Modern communications business models and paradigms: Subscriber-centric model; consumer-centric model; integrated heterogeneous networking, infrastructural elements.

**ET4023 INTRODUCTION TO SECURITY AND CRYPTOGRAPHY**

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

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

**ET4025 NETWORK PROTOCOLS LABORATORY**

**Rationale And Purpose Of The Module:**
The aim of this module is to offer the students a learn-by-doing approach in communications and computer networks, for a better understanding of how networking technologies, mainly network protocols, operate in practice. Using appropriate laboratory facilities (real network equipment, protocol analysis software), the students will be allowed to observe, measure and experiment various communications protocols. It provides the student with a comprehensive coverage of computer networking and their protection, with a strong practical emphasis.

At the completion of the module, students should have an understanding of the important issues in providing communications software for various types of computer networks. This includes LAN medium access protocols, WAN data link protocols and the TCP/IP protocol stack, mainly focusing on application protocols for file transfer, network management network security.

**Syllabus:**
Overview of computer forensics technology.
Compute forensics evidence - capture and analysis.
Legal permissions and restrictions on investigations of incidents.
Collecting evidence for trial: evidence integrity, chain of custody and admissibility.
RFC 1087 - Ethics and the internet including the 10 commandments of computer ethics.
ISC2 Code of ethics.
Irish Information Society Commission Ethics and Values in a Digital Age.

**ET4035 COMPUTER LAW, INVESTIGATION AND GRAPHICS**

**Syllabus:**
Overview of computer forensics technology.
Compute forensics evidence - capture and analysis.
Legal permissions and restrictions on investigations of incidents.
Collecting evidence for trial: evidence integrity, chain of custody and admissibility.
RFC 1087 - Ethics and the internet including the 10 commandments of computer ethics.
ISC2 Code of ethics.
Irish Information Society Commission Ethics and Values in a Digital Age.
**ET4047 EMBEDDED SOFTWARE**

**Rationale And Purpose Of The Module:**
The aim of the module is to provide an introduction to embedded processor systems and applications. The main objectives are to provide the student with an overview of the architecture of a simple microprocessor, to explain the operating principles and provide a functional understanding of assembly language.

**Syllabus:**
Introduce a simple microprocessor architecture - registers, buses and memory organisation and how it is used in embedded applications. Describe memory and I/O devices. Explain memory and I/O accesses. Introduce instruction sets, addressing modes, data move instructions, arithmetic instruction, stack operation and usage, program flow control instructions, sub routines and loops. Detail assembler directives and the program translation process. Review the build and load process for embedded application programs. Introduce simulation tools and debugging techniques. Introduce the monitor program and how to use it to test applications using target hardware.

Describe how to control/communicate with I/O devices through polling and interrupts. Interrupt service routines, interrupt priority, multiple interrupts, nesting. Use practical programming examples to illustrate concepts.

**ET4057 ELECTRONICS FOR BUILT ENVIRONMENT 1**
(No description given)

**ET4077 CLOUD COMPUTING**

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

**Syllabus:**

**ET411 ELECTROTECHNOLOGY ID**

**Rationale And Purpose Of The Module:**
An introduction to the overall basics of electrotechnology and electrical machines.

**Syllabus:**
Electric charge, movement of charge as a current, conductors and insulators, what makes electrical current flow, potential difference, voltage, resistance to electric current, simple dc circuit analysis, series and parallel connection of components, capacitors and charge storage, charging capacitors magnetic fields generated by electric current, electromagnetics. alternating current (ac), simple ac circuits. magnetism, magnetic flux, electro-magnetic induction. electrical generators, transformers, rectification, direct current (dc) generators, dc motors, induction motors. electronics, semi-conductor theory, diodes - rectification, transistors - switches/digital, amplifiers/analogue, IC's.

**ET4121 LABORATORY SKILLS 1**
(AUTUMN/1)
4 hours per week; 13 weeks/1st semester; 26L/26LAB; ECTS credits:6

Introduction to the electronic engineering laboratory: codes of conduct, operation of test and laboratory test and measurement equipment – power supply, signal generator, oscilloscope, circuit prototyping boards. Taking measurements and measurement equipment limitations. Electronic circuit prototyping, build and test: soldering, wire-wrapping, board design and layout, component choice and correct handling. Determining component values from the package coding. Printed Circuit Board (PCB) build and test, working in a project group environment.

**ET4132 INTRODUCTION TO WEB AND DATABASE TECHNOLOGY**

**Rationale And Purpose Of The Module:**
This module will introduce you to the concepts and techniques underlying the World Wide Web, such that you will gain a working knowledge of how to design and build web sites. The module will also present an introduction to relational databases and data models and manipulation.

**Syllabus:**
Overview of the Internet and World Wide Web; standards and specifications; Web browsers, Web servers and protocols; Designing & creating Web Pages with HTML; Web programming: overview of XHTML, XML, CSS and ActiveX controls; Multimedia on the WWW including Audio, Video and graphics; Data & information: characteristics, differences and structures; Data management: simple file storage & retrieval; Introduction to data modelling; Introduction to the concept of Database Management System (DBMS); Introduction to Structured Query Language (SQL).
ET4151 DIGITAL ELECTRONICS 1
4 hours per week; 13 weeks/1st semester;
26L/26LAB ECTS credits: 6

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

ET4244 OUTCOME-BASED LEARNING LABORATORY 2
4 hours per week; 13 weeks/3rd semester;
26L/13T26LAB; ECTS credits:6

Design of dynamic web-based user oriented systems, top down, bottom up design. Extraction and display of real world data. Data transmission point to point and through networks. Data exchange in multipoint systems. Data manipulation and storage on a PC. Interfacing PC to external system directly/over a network. Control of simple devices via active web pages. Data display in user-friendly format, graphic displays, data on demand. Prerequisite ET4112

ET4263 JAVA PROGRAMMING I
4 hours per week; 13 weeks/3rd semester;
26L/13T26LAB; ECTS credits: 6

Introduce students to Java language and compare it to C. Basic data types, control statements and methods. Import basic understanding of object oriented software development. Introduce Java documentation. Investigate role of Java Virtual Machine. Introduce Java Class Libraries. Introduction to UML. Introduce Java development environment. Complete simple programming assignments to drive home Java syntax and use of its development tools. Prerequisite ET4702

ET4305 INSTRUMENTATION AND CONTROL 1
4 hours per week; 13 weeks/5th semester

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

Controller design: PID control. Sampled data processes, digital PID. Instrumentation buses and standards. Prerequisites: ET4204 ET4224
Memory management: Virtual address space, secondary memory, shared memory, addressing, performance issues, system calls.
File management: File I/O, file access, different file systems, performance issues, system calls.
Device management: Device drivers, streams, interrupt handling, disk drive example.
Laboratory: A set of laboratory exercises based on skeleton example programs will guide the student through the internals of the UNIX operating system. The example programs will be developed in shell scripts and C/C++ programming environments.

ET4407 ELECTRONICS AND THE ENVIRONMENT

Rationale And Purpose Of The Module:
The protection of the environment in conjunction with economic growth will become one of the great challenges of the 21st century for a multitude of reasons. If the electronics industry is to sustain its growth levels of the last number of decades going forward this challenge will become foremost in the job function of its employees. This module will introduce the concepts which underpin this challenge. It seeks to inform students of the necessity of environmental awareness in the electronics industry and to introduce the means by which these environmental issues can be addressed.

Syllabus:
2. Design for Environment (ECO Design): Life cycle chain analysis, design for recycling, reverse manufacturing, reverse logistics, end of life solutions.
3. Green materials: lead free interconnects, halogen free materials, all other materials outlined in WEEE and ROHS, packaging.
4. Sustainability, energy efficiency, alternative power supply.
5. Case studies discussing such issues as environmental challenges in the semiconductor industry, producer responsibility in the electronics industry and sustainable trade in the electronics sector of emerging economies among other topics.
6. Invited talks: Seminars by the local electronics industry on environmental challenges in their company.

ET4437 DISTRIBUTED COMPUTING AND JAVA (AUTUMN/7)
4 hours per week; 13 weeks/7th semester; 26L/26LAB; ECTS credits:6
To introduce the student to Java and Distributed Computing including Remote Method Invocation and JavaBeans. To examine the role of Java in Distributed Systems and Web based Services including Security issues. In addition XML and advanced GUI features will be investigated. On completion of this module the student should have an appreciation of the issues pertaining to the use of Java in a large Distributed Enterprise Environment.
JavaBeans Component Model, Creating a JavaBean.
Java-based Wireless Applications and J2ME.
Remote Method Invocation.
Enterprise JavaBeans and Distributed Transactions.
Messaging with the Java Messaging Service (JMS).
Jini - plug and play interfaces, discovery services.
JavaSpaces - Communicating and sharing information in asynchronous environments
Peer-to-Peer Applications.
Case Study.
Extenible Mark-up Language (XML) and Simple Object Access Protocol (SOAP).
Major programming project.

ET4907 ELECTRONIC SYSTEMS PROJECT 1

Rationale And Purpose Of The Module:
To enable the student to develop their ability to work on their own. To familiarise the student with the process of research, development and design. To develop the students ability in terms of verbal and written communication.

Syllabus:
At the end of the third year the student selects a project title from a list. The student is expected to complete some background reading over the summer vacation. Each student is expected to progress their own project throughout their final year with regular direction from their supervisor. The project will be completed during the second semester and a project report will be submitted for grading. Each project will be reviewed and graded by at least two academics. Two oral presentations (interim and final) by the students are part of the grading process. The subject of the projects will range from design and build to theoretical analysis.

ET4927 PROJECT 1

Rationale And Purpose Of The Module:
The project is intended to give students the chance to study a topic in the field in depth and to apply his/her theoretical knowledge to a practical situation. Whilst working on the project he/she learns to direct their own work, be critical of his/her own methods and also learns to construct project performance and to write a report presenting their results and reasoning.

RE4007 NON-LINEAR CONTROL

Rationale And Purpose Of The Module:
This module introduces students to some of the more common non linear analysis techniques that are applicable to modern robotics systems and control systems more generally.
Syllabus:
General: Lyapunov Stability Analysis, Absolute Stability and the Circle Criterion, Analysis of Steady-State Tracking Error, Describing Function Analysis, Phase plane methods, limit cycles and their determination.
Overview of rule-based non-linear control techniques.
Fuzzy Systems as Universal Approximators.
Fuzzy Identification and Estimation, Adaptive Fuzzy Control (Comparative Analysis of Fuzzy Model Reference Learning Control & Model Reference Adaptive Control), Fuzzy Supervisory Control
Neural Networks: Multi-Layer Networks as Universal Approximators, Radial Basis Function
Case studies involving Neural Networks and Fuzzy Systems.
**LIFE SCIENCES**

**BY4001 BIOLOGY 1 (AUTUMN/1)**
4 hours per week; 13 weeks/1st semester; 26L/26LAB; ECTS credits: 6

Introduction to biology; characteristics of life, scientific methodology; cell structure and function: membrane structure and function; chemistry of the cell and organism; biomolecules; animal physiology; respiratory, circulatory, digestive, reproductive and nervous system; mammalian hormones, sense organs, musculo skeletal system; introduction to micro-organisms; prokaryotic and eucaryotic organisms.

**BY4013 GENERAL MICROBIOLOGY (AUTUMN/2)**
4 hours per week; 13 weeks/3rd semester; 26L/26LAB; ECTS credits: 6

Microbial structure and function: microbial growth; nutrition; identification and enumeration; introductory systematics; bacterial endospore; applied aspects of microbiology and microbial ecology; microbiology of water; medical microbiology; disease and pathogenesis; food microbiology; preservation and spoilage; microbiology of soil biochemical cycles; biodegradation; some traditional and novel processes in industrial microbiology; microbes and biotechnology. Prerequisite BY4001

**BY4011 GENERAL BIOLOGY (AUTUMN/1)**
4 hours per week; 13 weeks/1st semester; 26L/26LAB; ECTS credits: 6

Introduction to biology; characteristics of life, scientific methodology; cell structure and function: membrane structure and function; chemistry of the cell and organism; biomolecules; Evolutionary theories; introduction to taxonomy; principles and scope of ecology; ecosystems; cycles in nature; energy flows; population and community dynamics; limiting factors; food chains; succession, environmental concerns; introduction to micro-organisms; prokaryotic and eucaryotic organisms.

**BY4015 PLANT PHYSIOLOGY**

*Syllabus:*

**BY4023 ANIMAL DIVERSITY**

*Syllabus:*
Evolution of animal diversity; Animal architecture; Environmental considerations; Invertebrate classification and relationships: the Protozoans, the Poriferans and Placozoans, Introduction to the hydrostatic skeleton, the Cnidarians, the Platyhelminthes, the Nemertines, the Molluscs, the Annelids and Sipunculans, the Arthropods, the Nematodes, the Echinodermes; An overview of invertebrate reproduction and development.

**BY4025 CROP AND GRASSLAND SCIENCE**

*Syllabus:*
Climate in Ireland, climate and plant growth, agricultural policy. Fruits crops, protected crops, horticultural pests, weeds and diseases, integrated crop production. Landscape management. Fertilisers and manures; tillage machinery; cultivation, management and harvesting of arable crops and root crops; farm forestry; energy crops; grassland establishment and management; agriculture and the environment.

**BY4035 CELLULAR BIOLOGY AND BIOCHEMISTRY**

*Rationale And Purpose Of The Module:*
To provide a solid understanding and knowledge of fundamental biochemical processes which will underpin the ability of secondary school educators to communicate effectively the central principles of biology.

*Syllabus:*
The course is delivered as a series of lectures covering the following topics: Topic 1: Carbohydrates
This is supported by a series of laboratory based practical investigations covering the following areas:
Area 1: Analysis of carbohydrates
Area 2: Exploring Lipids
Area 3: Behaviour of Amino acids and Proteins
Area 4: Enzymes
Area 5: Nutrition

The course is examined through a series of term tests, practical laboratory write ups, and an end of term exam based on multiple choice questions and essay style questions.

BY4045 CELL BIOLOGY AND BIOCHEMISTRY
(No description given)

BY4215 SOIL SCIENCE (AUTUMN/3)
4 hours per week; 13 weeks/5th semester;
26L/26LAB; ECTS credits:6

Geology and soil parent materials; weathering; soil composition; soil texture, structure, aeration and water movement; soil temperature; soil biology; soil organic matter and its decomposition; influence of organic matter on soil fertility; soil chemistry, cation exchange capacity, pH, liming of land; soil fertility and plant growth; soil genesis and classification, soil types, soil mapping.

EQ4013 FOUNDATIONS OF EQUINE LOCOMOTION
(No description given)

EQ4025 THE YOUNG HORSE
(No description given)

EQ4027 EQUESTRIAN FACILITIES

Syllabus:
Analysis of requirements for equine facilities with regard to: racing, sports horses, breeding, competition, exercise and training, client facilities, horse welfare and soundness, disease control, isolation and quarantine facilities. Ancillary facilities; feed stores, gallops, arenas, fixed and portable fences, dry and water treadmills, solaria, wash boxes, weighing facilities, loading bays, equipment storage, farriery and breeding areas, road and air transport environments. Planning and building requirements; materials, environmental impact, waste disposal, aesthetics. Use of ICT in equestrian establishments; staff training, monitoring horses, entries and administration, horse and client records, veterinary applications.

EQ4037 PERFORMANCE RIDER DEVELOPMENT

Syllabus:
Analysis of performance demands on the rider; sports disciplines, racing (flat and National Hunt), endurance, mental and physical capacities. Characteristics of performance riders; body morphology, attitudes to training, relationships with coach and supporters, technical, tactical, physical, mental and lifestyle capacities. Analysis of rider motor and proprioceptive capacity; video analysis, appropriateness and efficiency of sport movement, common difficulties in movement patterns, developmental plans for riders in various disciplines. Developing the rider; use of technology and equipment to provide feedback and support practise, use of novel development tools, athlete diaries, athlete driven reflection and goal setting, maintaining technique and focus in stress environments - race finishes, jump offs. Models of motor skill development and use of appropriate technology and equipment to support motor skill development.

EQ4051 INTRODUCTION TO HORSEMANSHIP
(No description given)

EV4003 EQUINE FEEDING AND BEHAVIOUR
(No description given)

EV4005 GRASSLAND AND GRAZING MANAGEMENT (AUTUMN/3)
4 hours per week; 13 weeks/5th semester;
26L/26LAB; ECTS credits:6

EV4012 EQUINE ANATOMY AND PHYSIOLOGY

Rationale And Purpose Of The Module:
To introduce students to fundamental concepts of Equine Anatomy and Physiology.

Syllabus:
The anatomy of the horse to be discussed with reference to musculoskeletal structure and organs. [The main systems of the horse; digestive, respiratory, circulatory (including lymphatics); reproductive (including embryology and physiology of reproduction); urinary; nervous and immune]. [Consideration of the theoretical background to the use and operation of modern diagnostic/treatment equipment] such as X-ray, ECG, ultrasound, laser and fibre optic based devices.

EV4023 EQUINE HEALTH AND ENVIRONMENTAL MANAGEMENT
(No description given)

EV4025 EQUINE BREEDING AND GENETICS

Syllabus:
Basic genetics including, cells, chromosomes, genes, alleles, gametes, genotype, phenotype; mitosis; meiosis and its role in genetics, genetic recombination; distances between genes; linked genes, Gene mapping; chromosome structure; DNA; replication, transcription, translation and the genetic code; Inborn errors of metabolism; Sex limited inheritance; PCR; Mendelian genetics including recessive, dominant, X linked and polygenic inheritance. Gene interaction, codominance and incomplete dominance; epistasis; Equine coat colour loci including extension, agouti, colour diluting loci, epistatic modifiers, tobiano, overo and spotting loci, mendelian and non mendelian aspects of equine coat colour; Biological basis of sex; X chromosome inactivation; Pedigree analysis and inheritance, determination of inheritance patterns; the normal karyotype; parentage testing of horses, including blood group testing, biochemical polymorphisms, DNA testing; Abnormal chromosome number and structure; including sex chromosome abnormalities and autosomal trisomies; population genetics, The Hardy-Weinberg law, extensions to the Hardy-Weinberg law including multiple alleles and X linked genes; genotype frequencies; heritability; narrow and broad sense heritability; quantitative trait loci; genotype-environment interaction; estimated breeding values and selection; BLUP; Relationship; Inbreeding and linebreeding.

FT4305 FOOD ENGINEERING PRINCIPLES

Rationale And Purpose Of The Module:
To provide students with an understanding of the basic engineering principles underpinning the processing of foods. To provide students with a understanding of the basic principles of heat and mass transfer as applied to food engineering.

Syllabus:

FT4421 INTRODUCTORY FOOD SCIENCE AND HEALTH

Rationale And Purpose Of The Module:
To provide an introductory course in food science and technology, highlighting the linkages between food and health. To highlight factors affecting food quality, safety and nutrition

Syllabus:
General overview of Food Science and its relationship to human health. Brief introduction to basic food components. Introduction to the scientific principles underpinning food production, preservation and packaging. Control systems to ensure food safety and quality e.g. Hazard Analysis Critical Control Point (HACCP). Impact of food processing technologies on health and nutrition, safety and quality. Introduction to the chemistry of nutritional and anti-nutritional components relevant to human health e.g. Malliard-browning reactions, protein degradation, lipid oxidation. Food and health issues of consumer concern including bovine spongiform encephalitis (BSE), genetically modified foods, E. coli 0157:H7.

FT4437 MILK PROTEINS AS FOOD INGREDIENTS (AUTUMN/4)
4 hours per week; 13 weeks/7th semester; 26L/26T; ECTS credits:6

Milk protein chemistry; caseins, whey proteins, minor constituents; functional properties of milk proteins; emulsification; foaming; gelation; significance of milk protein variants to the processing properties of milk; rennet coagulation; cheesemaking; heat stability; enzymatic hydrolysis of milk proteins;commercial proteinases; hydrolysate characterisation, milk protein allergenicity; immunoreactive peptide sequences; reduced/hypoallergenic milk protein hydrolysates. Nutraceuticals/bioactive peptides; angiotensin-
I-converting enzyme inhibitors; special assignments will involve review and discussion of relevant research papers.

FT4447 FOOD QUALITY

**Rationale And Purpose Of The Module:**
To provide a comprehensive course on food quality and safety.
To develop an understanding of the physical, molecular, and microbiological basis of food quality.

**Syllabus:**

FT4457 RESEARCH TRENDS IN HEALTH AND FOOD

**Rationale And Purpose Of The Module:**
To develop a high standard of competence in the acquisition and evaluation of scientific research information.
To enable students to develop a critical awareness of emerging research in the field of food science and health.

**Syllabus:**
Using specific examples, students will be trained how to critically evaluate research information. Students will be made aware of the requirements in technical writing and presentation skills. Demonstration of advanced information retrieval using the web of science and other abstracting services. Individual students will be assigned topics on emerging issues in food science and health research. Students will be required to write scientific reports and give presentations on their findings.

Representative areas and specific topics include:
- Food quality and safety (acrylamide, dioxins, genetically modified foods, organic foods)
- Novel food processing (ultrasonic and high pressure processing)
- Diet and health (cardiovascular disease, diabetes, the immune system, cancer, dieting and health)
- Food toxicology and allergenicity (novel food ingredients, food protein allergenicity)
- Nutraceuticals (Hypotensive peptides, peptides and cognitive function)
- Neutrigenomics (Diet and gene interactions)

LS4003 INTRODUCTORY ANATOMY AND PHYSIOLOGY

**Rationale And Purpose Of The Module:**
To provide the foundation for understanding the anatomy and physiological functioning of the human system so as to assist in the study of the effects of illness and disease on the individual. To acquaint students without a biological background with the basic concepts of general Anatomy and Physiology while providing a detailed introduction into cellular and tissue biology.

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

ME4001 INTRODUCTION TO ENGINEERING 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester; 26L/13T; ECTS credits: 6

Overview of the engineering disciplines. The profession of engineering, real-life engineering examples, skills required, career opportunities and career progression. Report writing including structure, presentation, information sources, plagiarism. Introduction to engineering units, calculations of units and conversion to standard units.

ME4011 CONTROL ENGINEERING

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

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

ME4037 ADVANCE MECHANICS OF SOLIDS (AUTUMN/3)
13 weeks / ECTS credits: 6


ME4047 FUELS AND ENERGY CONVERSION (AUTUMN/4)
13 weeks / ECTS credits: 6

Review of Thermodynamics. The Flow Through Gas Turbine Blade Rows:

ME4057 AEROSPACE METALLIC MATERIALS
(No description given)

ME4111 ENGINEERING MECHANICS 1 (AUTUMN/1)
4 hours per week; 13 weeks/1st semester; 26L/26LAB; ECTS credits: 6

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

ME4113 APPLIED MECHANICS (AUTUMN/2)
4 hours per week; 13 weeks/3rd semester; 26L/26LAB; ECTS credits: 6

Kinematics of simple mechanics and linkage; analysis of four bar linkages, straight line mechanisms, use of velocity and acceleration diagrams; Coriolis analysis; cams; Kinematics analysis of follower motion, velocity and acceleration of cams, construction of cam profiles, computer aided design of cams; forces analysis of cams; gears; gear kinematics and dynamics, simple and compound trains; epicyclical gears, referred inertia, torque and power transmission; balancing; balancing of rotors, static and dynamic balance, balancing of reciprocation masses; Gyroscope; gyroscope analysis and gyroscopic effects.

ME4117 VIBRATION ANALYSIS*
(AUTUMN/4)
4 hours per week; 13 weeks/7th semester; 26L/26LAB; ECTS credits: 6

Single degree of freedom systems; free response; springs in series and in parallel; logarithmic decrement; forced response to harmonic excitation; excitation by an unbalanced rotor; response to periodic excitation; Fourier series; impulse response; response to arbitrary excitation; free and forced response of two and multi-degree of freedom systems; use of the modal superposition method; use of the finite element method. Prerequisite ME4111
ME4121 ENGINEERING SCIENCE 1
(AUTUMN/1)
4 hours per week; 13 weeks/1st semester;
26L/26T; ECTS credits: 6

Mass, force, weight; forces in equilibrium;
frameworks; stress and strain; shear stress;
shear force diagrams, bending moment
diagrams; friction; velocity, acceleration,
relative velocity; motion in a circle; simple
harmonic motion; work, energy, power.

ME4213 MECHANICS OF SOLIDS 1*
(AUTUMN/2)
4 hours per week; 13 weeks/3rd semester;
26L/26LAB; ECTS credits: 6

Uniaxial stress and biaxial strain fields;
constitutive relations; shear force and bending
moment diagrams; bending of beams;
transverse shear stress in beams; composite
beams; temperature stress; torsion of
cylindrical sections; analysis of stress at a point
in 2D; principal stress and Mohr’s stress circle;
thin cylinders and thin spherical vessels.
Prerequisite ME4112

ME4227 AIRCRAFT STRUCTURE 2
(AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/26LAB; ECTS credits: 6

Theory of elasticity; Airy stress function.
Energy methods for structural analysis.
Shear and torsion of open and closed
thin walled sections, single and multicell
sections. Bending and twisting of thin plates.
Structural instability; inelastic buckling,
buckling of thin plates. Laminated composite
structures; stress analysis, failure criteria.
Stress analysis of aircraft components;
fuselages, wings. Application of proprietary
structural analysis software packages and the
application of Finite Element Analysis to
aircraft structures.

ME4307 BIOMATERIALS 1
Rationale And Purpose Of The Module:
Review understanding of biological systems;
To gain appreciation for soft tissue
replacement materials in current use;
To enable the student to understand materials
selection and design requirements for soft
tissue replacement applications.

Syllabus:
Materials for soft tissue replacement. Survey
of applications, haemocompatible materials,
materials for vascular grafts, stents and
heart valves, artificial skin, tendon ligament.
Materials for cosmetic implants. Ophthalmic
materials. Active implantable devices,
evacuocorporeal artificial organs. Dressings,
sutures, drug delivery materials/systems.

ME4404 AERODYNAMICS 1
Review of governing equations, application of
equations to fluid flow processes Thin aerofoil
theory, aerodynamic coefficients Finite span
wings, lifting line theory, vortex flow, induced
drag, downwash, lift distribution Boundary
layer separation and control Compressible
flow, normal and oblique shock waves,
aerofoils in compressible flow Introduction to
experimental techniques

ME4424 AERODYNAMICS 1
Review of governing equations, application of
equations to fluid flow processes Thin aerofoil
theory, aerodynamic coefficients Finite span
wings, lifting line theory, vortex flow, induced
drag, downwash, lift distribution Boundary
layer separation and control Compressible
flow, normal and oblique shock waves,
aerofoils in compressible flow Introduction to
experimental techniques

ME4438 COMPUTATIONAL FLUID
DYNAMICS (AUTUMN/4)
4 hours per week; 13 weeks/3rd semester;
26L/26LAB; ECTS credits: 6

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

ME4517 ENERGY MANAGEMENT
(AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/26LAB; credit: 6

Fossil fuel reserves and rates of consumption;
energy situation in Ireland, trends and
issues, present and future; energy and
the environment; energy tariffs and their
significance in industry; economics of energy-
payback period, present value, analysis, energy
audit; energy management systems; combined
heat and power; renewable energy sources;
optimising thermal equipment; Lagrange
multiplies; modelling thermal equipment; heat
exchanger effectiveness and number of transfer
units; availability, energy and minimisation of
entropy production.
Prerequisite ME4526

ME4523 THERMODYNAMICS
(AUTUMN/2)

First law of Thermodynamics with applications
to non-flow and to steady flow processes.
General Thermodynamic relationships and
properties.
Statements of the Second Law of
Thermodynamics including Carnot
efficiency. Corollaries of the Second Law
of Thermodynamics including the Clausius
inequality and concepts of irreversibility.
Otto, Diesel and Dual reciprocating engine
cycles. Joule cycle with applications to simple
gas turbine engines.
ME4611 COMPUTING (AUTUMN/1)
4 hours per week; 13 weeks/1st semester;
26L/26LAB; ECTS credits: 6

Introduction to computer organisation,
programming languages, top-down design
techniques; arithmetic operations including
intrinsic functions; control structures;
data files and input/output system; single
and multidimensional array processing;
implementing top-down design with functions
and subroutines; character, complex, and
double-precision data; internal, sequential and
direct access files; numerical applications; and
engineering applications. Operating System
(DOS) and use of spreadsheets.

ME4727 STABILITY AND CONTROL
(AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/26LAB; ECTS credits: 6

Equations of motion for a rigid body aircraft;
physical basis for longitudinal and lateral
stability derivatives; solution of the equations
for free longitudinal motions, phugoid and
short period modes, flight paths, variation of
roots with C.O.G. position, flying qualities;
free lateral motion; basic control theory,
transfer functions, block diagrams, state space
to transfer function representations for MIMO
systems, the root locus technique; open loop
control - response to controls; closed loop
control, autopilots with displacement and
velocity feedback, stability augmentation
systems with velocity feedback and full state
feedback.
Series functions; limits, continuity and differentiation from first principles; transcendental functions; vector algebra; complex numbers; differential calculus; properties; maxima and minima, curve sketching, roots of equations; undetermined forms; power series.

Vector Spaces; Inner Products, norms, orthogonality; Eigenvalues and eigenvectors. Diagonalisability; Numerical solution of systems of linear equations; iterative methods; nonlinear systems using Newton’s method.

The indefinite integral; numerical integration; ordinary differential equations; the Laplace Transform; Fourier series; matrix representation of and solution of systems of linear equations; vector spaces; numerical solution of systems of linear equations; Gauss elimination, LU-decomposition.

Multiple regression; analysis of variance; robust techniques; statistical experimental design; full and fractional factorials, composite design, orthogonal arrays; evolutionary operations. Prerequisite MA4004

Defining the research problem, formulating the research questions, quasi-experimental research designs, sources of data, data protection legislation, SQL, designing the data collection mechanisms, introduction to a suitable computing environment, date input, descriptive statistics and graphical methods, data analysis and interpretation including inference for a single proportion, a single mean, the difference between two proportions, and the difference between two means; the chi-squared test applied to contingency tables, simple linear regression and correlation, criticisms of data analysis with particular emphasis on the drawing of incorrect inferences due to poor design and/or poor analysis, report writing.

Real-value functions, simple numerical methods, matrices, graph theory.

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

Syllabus:
MA4601  SCIENCE MATHEMATICS 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester;
26L/13T; ECTS credits: 6

Vectors definition; addition; components, resultant, position vector; scalar product; dot product and angle between vectors; cross product; simple applications in mechanics.

Complex Numbers: necessity and definition; algebra including multiplication, conjugate, division, modulus; Argand diagram representation; polar form, argument; exponential form; de Moivre's theorem, powers and roots. Trigonometry: basic definitions and relation to unit circle; basic formulae and identities; frequency, amplitude and phase; more formulae using complex exponential.

Linear equations: solution of systems of linear equations by Gaussian elimination; examples with a unique solution, an infinite number or no solutions. Matrices: Addition and multiplication; matrix inversion; simple determinants.

Functions: graphs and functions; polynomial and algebraic functions; curve-fitting; least-squares approximation formula only; exponential and logarithm; inverse function; limits and continuity. Derivative and applications basic concepts: slope as rate of change; differentiation of sum, product, quotient; chain rule; derivative of standard functions; tangent and normal; higher derivatives; maxima and minima; applications to optimisation in science.

MA4603  SCIENCE MATHEMATICS 3 (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester;
26L/13T; ECTS credits: 6

Variables; representation of variables; reduction of variables; introduction to the fundamentals of probability; Baye's theorem; introduction to random variables; special distributions; binomial, Poisson, geometric, uniform, exponential, normal; statistical inference; non-parametric tests; correlation and regression.

Prerequisites MA4601, MA4602

MA4605  CHEMOMETRICS (AUTUMN/3)
3 hours per week; 13 weeks/5th semester;
26L/13T; ECTS credits: 6

Statistical process control; capability studies; correlation and regression; multiple regression; importance of plotting data; design of experiments of variance; factorial designs; Plackett-Burman design.

Prerequisite MA4603

MA4607  INTRODUCTION TO APPLIED MATHEMATICAL MODELLING IN CONTINUM (AUTUMN/4)
3 hours per week; 13 weeks/7th semester;
26L/13T; ECTS credits: 6

Continuum theory, balance of momenta, constitutive laws, elementary viscous flow, waves, aerofoil theory, vortex motion, Navier Stokes equations, very viscous flow, thin film flow, boundary layer theory, instability and turbulence, introduction to linear elasticity and rheology, illustrative real examples from the sciences.

MA4701  TECHNOLOGICAL MATHEMATICS 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester;
26L/13T; ECTS credits: 6

Functions; trigonometry; the derivative and its applications; experimental laws; linear equations; vectors; complex numbers 63

Prerequisite MA4603

MA4707  QUALITY MANAGEMENT (AUTUMN/4)
3 hours per week; 13 weeks/7th semester;
26L/13T; ECTS credits: 6

History of quality; Quality organisation; Quality Planning; Standards and Vendors; Modern Quality development; Continuous improvement strategy, Economics of Quality

Prerequisite: MA4701

MB4001  ALGEBRA 1 (AUTUMN/1)
3 hours per week; 13 weeks/1st semester;
26L/13T; ECTS credits: 6

Number: basic number concepts; number systems; elementary number theory; solution by graphical and numerical methods; matrices; applications.

MB4005  ANALYSIS (AUTUMN/3)
3 hours per week; 13 weeks/5th semester;
26L/13T; ECTS credits: 6

Functions of a real variable; differentiability; set theory; Bolzano-Weirstrass theorem; sequences and series; general topology; integration; Riemann integral, basic integration theorems, improper integrals; functions of a complex variable; differentiability; complex integration; residues; complex power series; applications.

Prerequisite: MA4601

MS4008  MATHEMATICAL METHODS 2

Rationale And Purpose Of The Module:
Having completed this module, the students should understand and be able to apply the standard finite difference methods for the numerical solution of two-dimensional linear partial differential equations; they should also understand how the finite element method is used to solve similar problems.

Syllabus:
Finite difference methods: Elliptic problems: stability, consistency and convergence; parabolic problems; explicit and implicit methods, Von Neumann stability analysis; hyperbolic problems; method of characteristics.

Finite element method: Introduction to FEM for elliptic problems: analysis of Galerkin FEM for a model self-adjoint two point boundary
value problem, weak solutions, linear basis functions, matrix assembly; extension of method to two dimensions, triangular and quadrilateral elements.

MS4013 FOURIER ANALYSIS (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 26L/13T; ECTS credits:6

Orthogonal sets of functions; inner products of vectors, orthonormality, generalised fourier series, approximation in the mean, closed and complete systems, orthogonal functions generated by differential equations; fourier series; definition, periodicity, even and odd functions, sine and cosine series, half range series, piecewise continuous functions, fourier theorem, orthonormal trigonometric functions, differentiation and integration of fourier series, uniform convergence, applications e.g. inhomogeneous ODEs, fourier integral, outline of sturm liouville theory:linear transforms, laplace transforms and properties, application to simple odes fourier transform and properties, applications in signal analysis, introduction to green's functions and to demonstrate applications of these techniques. 

Prerequisite MS4013

MS4025 APPLIED ANALYSIS (AUTUMN/4)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

To introduce students to the standard techniques of complex analysis, integral equations and Green's functions and to demonstrate applications of these techniques. 

Prerequisite MS4013

MS4027 FUNDAMENTALS OF FINANCIAL MATHEMATICS

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

Syllabus: 


Prerequisites MS4131 and MS4013.

MS4101 MATHEMATICAL LABORATORY (AUTUMN/1)
5 hours per week; 13 weeks/1st semester; 26L/39LAB; ECTS credits:6

Structure of a digital computer; introduction to MS-DOS and its command language; introduction to MS-WINDOWS; using a spreadsheet (MS EXCEL) as a tool for manipulation, analysis and graphical display of data; using a symbolic algebra package (MAPLE) for the analysis and solution of simple mathematical models.

MS4105 LINEAR ALGEBRA 2 (AUTUMN/3)
3 hours per week; 13 weeks/5th semester; 26L/13T; ECTS credits:6

The aim of this module is to introduce some more advanced concepts in Linear Algebra and Numerical Linear Algebra. 

Prerequisites MS4131 and MS4013.

MS4111 DISCRETE MATHEMATICS 1

Rationale And Purpose Of The Module: 
The aim of this module is to introduce students to some of the language of Discrete Mathematics, and to show its relevance, particularly in the context of Computer Science. It is taught at a level that is appropriate to first year students, i.e. without an excess of formality. The module should re-inforce the development of the students.
“thinking” skills, and should enable them to undertake further study in the various applied areas of Discrete Mathematics (coding, graphs, logic and formal systems etc)

Syllabus:
Review of sets and operations on sets, power sets.
Propositional logic, truth tables, propositional calculus, equivalence.
Predicate logic, quantifiers, equivalence, application to (mathematical) proof.
Cartesian product of sets, relations, equivalence relations, matrix representation of relations, composition of relations, functions, types of functions.
Number systems, natural numbers, integers, rationals, reals, axioms for N, proof by induction, recursive definitions and algorithms, recurrence relations.
Representations of N (binary, octal, etc), other number “fields”.
Introductory combinatorics, permutations, combinations.

MS417 DISCRETE MATHEMATICS 2 (AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/13T/13LAB; ECTS credits:6
Graphs, directed graphs and their computer representation. Graph algorithms. Graph colouring with applications. Network flows and matchings. Planar graphs and Hamiltonian graphs. Prerequisite MS4132

MS4131 LINEAR ALGEBRA 1* (AUTUMN/1)
3 hours per week; 13 weeks/1st semester;
26L/13T; ECTS credits:6
Matrices acting on vectors, eigenvalues and eigenvectors esp. in 2 and 3 dimensions. Applications to (some of, and eg) input-output models, least squares fit, simple Markov chains, geometric transformations, diagonalisation of matrices.

MS4213 PROBABILITY THEORY (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester; 39L;
ECTS credits:6
Elementary probability, sample space, events, compound events, the laws of probability, conditional probability, independence; random variables, probability distribution, probability density, moments, expectation, variance; binomial, Poisson, Geometric, uniform, normal, exponential, gamma, chi-squared joint probability distributions, conditional distribution, covariance; functions of a random variable, distribution of sum, difference, product, and quotient of two random variables; introduction to Markov chains.

MS4214 STATISTICAL INFERENCE (AUTUMN/2)
3 hours per week; 13 weeks/4th semester;
26L/13LAB; ECTS credits:6
This course introduces students to the formalities of statistical inference with special emphasis on problems of estimation, confidence intervals and hypothesis testing. Prerequisites MS4212, MS4213

MS4215 ADVANCE DATA ANALYSIS 4 (AUTUMN/3)
3 hours per week; 13 weeks/5th semester;
26L/13T; ECTS credits:6
Simple Linear Regression : calibration, reverse prediction, regression through the origin, analysis of residuals, regression diagnostics, leverage and influence.
Matrix formulation of the linear model: Multiple regression, partial correlation, polynomial regression.
Analysis of Variance : One-way ANOVA, multiple comparisons, Two-way ANOVA, interactions, Analysis of covariance.
Introduction to Generalized Linear Models including non-linear regression, logistic regression and log-linear models.

MS4217 STOCHASTIC PROCESSES (AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/13T/13LAB ; ECTS credits:6
Conditional probability and conditional expectations; Markov chains, Chapman-Kolmogorov equations, classification of states, limiting distributions, random walks, branching processes, time reversible Markov chains; Renewal Theory, counting processes, the Poisson process; Semi-Markov processes; Queuing theory, the M/G/I and G/M/I systems, multi-server queues; continuous-time Markov chains, birth and death processes; Brownian motion with application in option pricing. Prerequisite MS4213
MS4315 OPERATIONS RESEARCH 2 (AUTUMN/3)
3 hours per week; 13 weeks/5th semester;
26L/13T; ECTS credits: 6

This module introduces further Operating Research technique for decisionmaking; Monte Carlo methods; simulation; integer programming; deterministic dynamic programming; probabilistic dynamic programming and Network problems.
Prerequisite MS4303

MS4407 PERTURBATION TECHNIQUES AND ASYMPTOTICS (AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/13T/13LAB; ECTS credits: 6

Non-dimensionalisation, scaling, ordering, definition of asymptotic series, algebraic equations, integrals, Laplace's method, method of steepest descent, regular and singular perturbations, multiple scales, strained coordinates, boundary layer techniques.
Prerequisites MS4403, MS4404

MS4403 ORDINARY DIFFERENTIAL EQUATIONS (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester;
26L/13T; ECTS credits: 6

Linearity. Review of first order equations.
Second order linear equations. Series solution.
Sturm-Liouville theory. Nonlinear ODEs.
Regular perturbation techniques.

MS4613 VECTOR ANALYSIS (AUTUMN/2)
3 hours per week; 13 weeks/3rd semester;
26L/13T; ECTS credits: 6

Vectorial mechanics: rotation of axes, index notation, review of vector and scalar algebra (scalar vector and triple scalar products); vector functions of a real variable, functions of time; differentiation of vectors, derivative of dot and cross products, tangent to a curve, arclength, smoothness, curvature applications in mechanics. Fields; scalar and vector fields; functions of several variables, maxima/minima, contour maps, directional derivative and gradient vector field; applications in electromagnetism and fluid mechanics; vector identities; cylindrical and spherical coordinates. Line, surface and volume integrals and work; conservation of energy and potential function; applications to planetary dynamics, area, surface and volume integrals; gauss's green's and stokes's theorems multiple integrals in radial, cylindrical and spherical coordinates, scalar and vector potentials, helmholtz's theorem tensor algebra and calculus: review of matrix algebra introducing suffix notation; definition of determinant; evaluation of determinants by row and column expansion.

MS4627 TOPICS IN FLUID DYNAMICS (AUTUMN/4)
4 hours per week; 13 weeks/7th semester;
26L/13T/13LAB; ECTS credits: 6

Topics from: slow flow, waves and viscous flow, boundary layer theory, flow instabilities, geophysical fluid dynamics, computational fluid dynamics, classical aerofoil theory.
Prerequisites MA4607, MS4404

MATHEMATICS & STATISTICS
PHYSICS & ENERGY

PH4003 MECHANICAL ENERGY

Syllabus:
Mechanical vibrations, simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations. Waves, transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves. Review of the principles of mechanics: inertial frames, Newton’s laws of motion, kinetic and potential energy. Rigid bodies: rotation and moments of inertia, angular momentum and kinetic energy, torque. Fluid dynamics: Bernoulli equation, equations of motion in integral form, equations of motion in differential form, kinematics, vorticity, potential flow, dimensional analysis, viscous flows, exact solutions, pipe flow, laminar boundary layers, boundary layer solution methods, turbulence. Fluid heat transfer and a thorough understanding of how these disciplines apply to the design and analysis of complex thermal fluid systems.

Applications to Ocean, Hydro and Wind renewable energy systems

PH4007 SOLAR AND NUCLEAR ENERGY

Syllabus:
Solar energy and conversion, solar radiation, net radiation flux at the Earth, basic principles of energy conversion. Photovoltaic conversion, solar electricity generation, photovoltaic electric principles, photovoltaic system wiring, batteries, photovoltaic controls. Energy supply systems, simulation of system performance, photovoltaic power production, sizing photovoltaic systems.


PH4011 PHYSICS FOR ENGINEERS 1 (AUTUMN/1)
5 hours per week; 13 weeks/1st semester; 26L/13T/26LAB; ECTS credits:6

Mechanics; vector algebra; Newton’s laws; motion; moment of inertia; conservation of linear and angular momentum; collisions; conservation of energy; elasticity; Hooke’s law; the atom; semiconductors; free electron theory; elementary quantum theory; insulators, semiconductors, conductors, superconductors; electronic devices; diodes; bipolar transistor.

PH4021 PHYSICS OF SOLIDS

Rationale And Purpose Of The Module:
The purpose of the module is to introduce the student to the structure and properties of solid materials. The objectives are to discuss the major classes of solids and their properties and applications, and to present the physical principles needed for an understanding of the observations.

Syllabus:
PH4027 WIND, OCEAN AND HYDRO ENERGY

Rationale And Purpose Of The Module: This module is proposed to supplement existing modules in the creation of the BSc Energy. This interdisciplinary module seeks to introduce students to wind, ocean, hydro and other renewable energy sources and equip them with the knowledge, and analytical skills necessary to advise on their appropriate use.

Syllabus:

PH4031 PHYSICS FOR GENERAL SCIENCE

Rationale And Purpose Of The Module: An understanding of physics is essential in describing and understanding many processes and phenomena associated with chemical and life-science related disciplines. This one semester course is specifically designed to provide such students with a firm grounding in basic physics illustrated and reinforced with chemical, life and sports science related examples and applications.

Syllabus:
Mechanics: units; kinematics; dynamics; motion in a circle; statics; the standard human; energy; momentum; simple harmonic motion; waves; sound and hearing.
Materials: elasticity; pressure; buoyancy; surface tension; fluid dynamics.
Heat: temperature; gases; phases; heat transfer; thermodynamics and the body, thermal conductivity.
Electricity: static electricity; electric force and fields; electric potential and energy; dc circuits; radio frequency radiation; physiological effects of electricity.
Magnetism: nmr, focus on medical imaging. Generator and motor.
Optics: light; geometrical optics; physical optics; electromagnetic spectrum; Lasers; the eye and vision.
Radiation: atoms; nucleus; ionising radiation; biological effects.

PH4037 ENERGY RESOURCE ASSESSMENT

Syllabus:

Problem-based learning: Wind example, hydro example, biofuel example. Macro energy resource assessment and planning at regional and national level.

PH4041 OPTICS

Rationale And Purpose Of The Module: The aim of this course is to develop and extend the students knowledge of the principles of physical optics and introduce the students to contemporary optics.

Syllabus:
PH4051 MEASUREMENT AND PROPERTIES OF MATTER

Rationale And Purpose Of The Module:
The purpose of this module is to first introduce fundamental principles of physical measurement and data analysis which are important throughout the course and to introduce the mechanical and thermal properties of solids, liquids and gases.

Syllabus:

PH4061 QUANTUM MECHANICS

Rationale And Purpose Of The Module:
The purpose of the module is to extend the students understanding of quantum mechanics and to introduce students to applications of quantum mechanics in solid state physics.

Syllabus:

PH4071 SEMICONDUCTORS 1

Rationale And Purpose Of The Module:
The purpose of this module is to introduce students to the fundamentals of semiconductor process technology focusing on silicon technology and integrated circuit processes.

Syllabus:
Semiconductor technology: overview of advances in integrated circuits, the road map, Moore’s law. General nature of semiconductor materials: elemental materials and their uses in research and industry, compound materials and alloys and their applications, influence of purity on electrical properties of semiconductors. Structure of semiconductors: amorphous, crystalline and polycrystalline solids, unit cells, lattice types, body centred cubic, face centred cubic, the diamond lattice, Si and Ge, Miller indices. Electrical properties: contribution of mobility and free carrier density to resistivity, electrical properties of conductors, semiconductors and insulators. Semiconductors: pure semiconductors, important elements from group 3, group 4 and group 5 of the periodic table, valence electrons, covalent bonding, p-type semiconductors and n-type semiconductors, energy levels for p-type and n-type semiconductors, intrinsic energy level, intrinsic carrier density, thermal equilibrium, carrier lifetime. Doping of silicon: donors and acceptors, majority carriers and minority carriers, hot point probe, 4-point probe sheet resistance, carrier transport. Lithography: lithography processes (light sources, exposure systems, photore sist), aerial image, latent image, relief image, pattern definition, pattern transfer (etching, deposition, implantation etc.). Optical lithography techniques: optical resists, key resist parameters, positive and negative resist, DNQ system and deep UV system. Resist processing: priming, spinning, baking, exposing, developing, hard baking, stripping. Exposure: types of exposure (UV light to deep UV, X-rays, electrons, ions), method of exposure, development (positive, negative). Printing: Fresnel system, contact and proximity printing, Fraunhofer system, projection printing, advantages and disadvantages. Advanced lithography: focused ion beam, electron beam, etc. Thermal oxidation of silicon: the oxidation process, type of furnaces, wet oxidation, dry oxidation, factors influencing oxidation rates, silica film thickness measurements. Thin film deposition: evaporation, sputtering, chemical vapour deposition. Diffusion: diffusion processes, constant source diffusion, limited source diffusion, solid solubility limits. Epitaxial silicon deposition: LPCVD amorphous silicon, importance of epitaxy. Ion implantation: implantation technology, channelling, lattice damage and annealing.
PH4081 NANOTECHNOLOGY 1

Rationale And Purpose Of The Module:
The aim of this course is to combine basic science of size effect in materials in the micro to nanoscale dimension leading to various cutting-edge applications. The main objective is to introduce the students about the scientific importance and technological potential of developments in micro- and nano structuring of materials.

Syllabus:

PH4082 FIBRE OPTICS AND OPTOELECTRONICS

Rationale And Purpose Of The Module:
The aim of this course is to develop and extend the students knowledge of the principles of fibre optics and introduce the students to contemporary optoelectronics.

Syllabus:


Optical modulators and switches: electrooptic effect, titanium-diffused LiNb03 technology, quantum-well electroabsorption modulators. Optical amplifiers.

PH4091 PHYSICS OF MODERN MEASUREMENT

Rationale And Purpose Of The Module:
The purpose of the module is to provide an introduction to the physical principles and applications of advanced surface analytical techniques.

Syllabus:
Microscopy: image formation, resolution, light microscopy, near-field scanning optical microscopy (NSOM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning transmission electron microscopy (STEM), scanning tunnelling microscopy (STM), scanning force microscopy (SFM). Diffraction and scattering: elastic and inelastic scattering, Bragg’s law, the reciprocal lattice, Laue equations, x-ray diffraction (XRD), neutron diffraction, selected area electron diffraction in the transmission electron microscope (SAD), electron probe x-ray microanalysis (EPMA), extended x-ray absorption fine structure (EXAFS), surface extended x-ray absorption fine structure and near edge x-ray absorption fine structure (SEXAFS/NEXAFS), low-energy electron diffraction (LEED), reflection high-energy electron diffraction (RHEED), particle-induced x-ray emission (PIXE), x-ray fluorescence (XRF). Spectroscopy: vibrations in molecules and solids, selection rules, energy-dispersive x-ray spectroscopy in the scanning electron microscope (EDS), electron energy-loss spectroscopy in the transmission electron microscope (EELS), x-ray photoelectron spectroscopy (XPS), ultraviolet photoelectron spectroscopy (UPS), Auger electron spectroscopy (AES), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy, nuclear magnetic resonance (NMR), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), inductively coupled plasma mass spectroscopy (ICPMS), positron annihilation spectroscopy (PAS).

PH4131 MECHANICS/HEAT/ ELECTRICITY/MAGNETISM

Rationale And Purpose Of The Module:
This module provides an understanding of the basic concepts of the mechanical, thermal, electrical and magnetic properties of matter, knowledge of which is the foundation of the engineering and technology on which our present society is dependent. The principles
covered in this course find application throughout the students degree programme. The principles are a key foundation of the degree programme and are extensively developed in theory and practice in the subsequent years of the programme.

**Syllabus:**


Electricity: charge, electric field, Coulomb's law, Gauss's law, Electric potential, capacitance, Ohm's law, Kirchhoff's Laws, dc circuit analysis, Joule heating. RC circuits.

Magnetism: magnetic field, magnetic force and torque, the galvanometer. Ampere's law. Electromagnetic Induction: inductance. Faraday's law,Lenz's law, the generator and motor, back emf.

**PH4161 ATOMIC/MOLECULAR/LASER PHYSICS**

*Rationale And Purpose Of The Module:*
This module develops the student's knowledge of atomic and molecular physics, particulary where these are relevant to spectra and laser physics. Based on this the module introduces the fundamentals of laser physics and laser applications including holography.

**Syllabus:**
Atomic structure: the hydrogen atom, energy level diagram and the origin of spectra, many-electron atoms, the influence of external fields, hyperfine structure, isotopic shifts, the shell model, X-ray spectra.
Molecules: diatomic molecules, vibrational and rotational states, complex molecules, vibrational modes.
Molecular emission and absorption spectra in the visible and infrared.
Spatial and temporal properties: Gaussian beams, cavity modes, mode locking and Q switching, solid state lasers.
Laser Applications: industrial, medical, data storage, holography and holographic techniques, laser safety.

**PH4171 MECHANICS**

*Rationale And Purpose Of The Module:*
The purpose of this module is to enhance students' understanding of key concepts and models associated with classical mechanics, vibrations and waves. The objectives are to develop the mechanics of single particles and of systems of particles including vibrations and waves and rigid bodies, and to introduce Lagrangian and Hamiltonian methods which also provide background for quantum mechanics.

**Syllabus:**
Mechanical vibrations: simple harmonic and damped simple harmonic motion, quality factor, forced oscillations, coupled oscillations.
Waves: transverse and longitudinal waves, phase and group velocity, energy transported by waves, reflection and transmission of waves.

**PH4181 INTRODUCTION TO ENERGY**

*Syllabus:*

Beginning with the vague description of energy as something we pay for, the product of fuel, we proceed to fuller descriptions in which the meaning and measurement and use of energy will become definite. Introduce the historical evolutions of concept of work and energy through the work of the davy, joule, watt etc. Measurement, units for energy, machines and mechanical advantage without energy efficiency. Perpetual motion, first law of Thermodynamics, Carnot cycle. Mechanical equivalent of heat. Forms of energy, gravitational potential energy, elastic or strain energy, kinetic energy, heat and molecules, chemical energy, food, rotational energy, electric energy, magnetic energy, electromagnetic energy, wave energy, nuclear energy. Conservation of energy. Uses of energy, ordered energy, disordered, entropy.

Every two/three weeks debate between 2
groups over major issues e.g. increase energy production vs change behaviour to save energy, preserve beauty of coast line vs increase quantity of onshore turbine, how do we know that an energy system is reliable, of low risk, economically viable, socially compatible and resilient in the face of natural catastrophes.

PH4607 SOLID STATE PHYSICS 1 (AUTUMN/4)
5 hours per week; 13 weeks/7th semester; 26L/13T/26LAB; ECTS credits: 6

Theories of conduction and magnetism]: breakdown of classical theories; magnetic properties of solids; classification of types of magnetism. Crystal dynamics: lattice vibrations; phonons; anharmonic effects; thermal conduction by phonons. Energy band theory; quantum theory of conduction. Superconductivity. Magnetism: diamagnetism; paramagnetism; magnetic order. 
Prerequisite PH4403