Swansea University
Prifysgol Abertawe

FACULTY OF SCIENCE AND ENGINEERING

POSTGRADUATE TAUGHT STUDENT HANDBOOK

MSc (FHEQ LEVEL 7)

MSc COMPUTATIONAL MECHANICS DEGREE PROGRAMME

SUBJECT SPECIFIC
PART TWO OF TWO
MODULE AND COURSE STRUCTURE
2023-24

DISCLAIMER

The Faculty of Science and Engineering has made all reasonable efforts to ensure that the information contained within this publication is accurate and up-to-date when published but can accept no responsibility for any errors or omissions.

The Faculty of Science and Engineering reserves the right to revise, alter or discontinue degree programmes or modules and to amend regulations and procedures at any time, but every effort will be made to notify interested parties.

It should be noted that not every module listed in this handbook may be available every year, and changes may be made to the details of the modules. You are advised to contact the Faculty of Science and Engineering directly if you require further information.

The 23-24 academic year begins on 25 September 2023

Full term dates can be found here

DATES OF 23-24 TERMS

25 September 2023 – 15 December 2023

8 January 2024 – 22 March 2024

15 April 2024 – 07 June 2024

SEMESTER 1

25 September 2023 – 29 January 2024

SEMESTER 2

29 January 2024 – 07 June 2024

SUMMER

10 June 2024 – 20 September 2024

IMPORTANT

Swansea University and the Faculty of Science of Engineering takes any form of **academic misconduct** very seriously. In order to maintain academic integrity and ensure that the quality of an Award from Swansea University is not diminished, it is important to ensure that all students are judged on their ability. No student should have an unfair advantage over another as a result of academic misconduct - whether this is in the form of **Plagiarism**, **Collusion** or **Commissioning**.

It is important that you are aware of the **guidelines** governing Academic Misconduct within the University/Faculty of Science and Engineering and the possible implications. The Faculty of Science and Engineering will not take intent into consideration and in relation to an allegation of academic misconduct - there can be no defence that the offence was committed unintentionally or accidentally.

Please ensure that you read the University webpages covering the topic – procedural guidance here and further information here. You should also read the Faculty Part One handbook fully, in particular the pages that concern Academic Misconduct/Academic Integrity.

Welcome to the Faculty of Science and Engineering!

Whether you are a new or a returning student, we could not be happier to be on this journey with you.

At Swansea University and in the Faculty of Science and Engineering, we believe in working in partnership with students. We work hard to break down barriers and value the contribution of everyone.

Our goal is an inclusive community where everyone is respected, and everyone's contributions are valued. Always feel free to talk to academic, technical and administrative staff, administrators - I'm sure you will find many friendly helping hands ready to assist you. And make the most of living and working alongside your fellow students.

During your time with us, please learn, create, collaborate, and most of all – enjoy yourself!

Professor David Smith
Pro-Vice-Chancellor and Executive Dean
Faculty of Science and Engineering

Faculty of Science and Engineering	
Pro-Vice-Chancellor and Executive Dean	Professor David Smith
Director of Faculty Operations	Mrs Ruth Bunting
Associate Dean – Student Learning and Experience (SLE)	Professor Laura Roberts
School of Aerospace, Civil, Electrical, General and Mechanical Engineering	
Head of School	Professor Antonio Gil
School Education Lead	Professor Cris Arnold
Head of Civil Engineering	Professor Eduardo De Souza Neto
Civil Engineering Programme Director	Dr Clare Wood
Year Coordinators	Professor Rubén Sevilla

STUDENT SUPPORT

The Faculty of Science and Engineering has two **Reception** areas - Engineering Central (Bay Campus) and Wallace 223c (Singleton Park Campus).

Standard Reception opening hours are Monday-Friday 8.30am-4pm.

The **Student Support Team** provides dedicated and professional support to all students in the Faculty of Science and Engineering. Should you require assistance, have any questions, be unsure what to do or are experiencing difficulties with your studies or in your personal life, our team can offer direct help and advice, plus signpost you to further sources of support within the University. There are lots of ways to get information and contact the team:

Email: studentsupport-scienceengineering@swansea.ac.uk (Monday–Friday, 9am–5pm)

Call: +44 (0) 1792 295514 (Monday-Friday, 10am–12pm, 2–4pm).

Zoom: By appointment. Students can email, and if appropriate we will share a link to our Zoom calendar for students to select a date/time to meet.

The current student **webpages** also contain useful information and links to other resources:

https://myuni.swansea.ac.uk/fse/

READING LISTS

Reading lists for each module are available on the course Canvas page and are also accessible via http://ifindreading.swan.ac.uk/. We've removed reading lists from the 23-24 handbooks to ensure that you have access to the most up-to-date versions.
We do not expect you to purchase textbooks, unless it is a specified key text for the course.

THE DIFFERENCE BETWEEN COMPULSORY AND CORE MODULES

Compulsory modules must be **pursued** by a student.

Core modules must not only be **pursued**, but also **passed** before a student can proceed to the next level of study or qualify for an award. Failures in core modules must be redeemed.

Further information can be found under "Modular Terminology" on the following link - https://myuni.swansea.ac.uk/academic-life/academic-regulations/taught-guidance/essential-info-taught-students/your-programme-explained/

MSc (FHEQ Level 7) 2023-24
MSc Computational Mechanics

YEAR 1 – Commencing at Swansea

Semester 1 Modules	Semester 2 Modules
EG-M23 **Finite Element Computational Analysis** **10 Credits** **CORE**	**EG-M47** **Business Leadership for Engineers** **10 Credits** **CORE**
EGEM03 **Continuum Mechanics** **10 Credits** **CORE**	**EGIM06** **Computational Fluid Dynamics** **10 Credits** **CORE**
EGIM02 **Advanced Computational Methods for Engineers** **10 Credits** **CORE**	
EGIM07 **Dynamics and Earthquake Analysis of Structures** **10 Credits** **CORE**	
Research Project	
EG-M194 **MSc Industrial Experience Preparation** **0 credits**	
EG-M102 **Industrial project** **30 Credits** **CORE**	
Total 120 Credits	

Optional Module Choose exactly 20 credits

EG-M07	Optimisation	TB2	10 (CORE)
EGEM07	Fluid-Structure Interaction	TB2	10 (CORE)
EGIM08	Plasticity in Structural and Geotechnical Engineering	TB2	10 (CORE)

And

Choose exactly 10 credits

EGIM10F	Communications skills in a foreign language - French	TB1	10 (CORE)
EGIM10G	Communications skills in a foreign language - German	TB1+2	10 (CORE)
EGIM10S	Communications skills in a foreign language - Spanish	TB1	10 (CORE)

EG-M07 Optimisation

Credits: 10 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof C Giannetti

Format: Timetabled lectures and example classes 30 hours;
Directed private study 70 hours
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Assessment:
Exam: Extended Coursework 80% (LO1, 2 & 3)
Continuous Assessment: 20% - Assignment 1 (LO1 & 2) and Assignment 2 (LO 2 & 3)

Module Aims: This module provides an introduction to some important techniques of optimisation that may be used across a broad range of engineering disciplines. The focus is on understanding the methods through hand calculation rather than the use of particular software packages. Numerical examples are employed to illustrate concepts and potential applications.

Module Content:
Indicative syllabus content:
1. Statement of optimisation and reliability problems.
2. Lagrange multipliers
3. One-Dimensional Minimisation Methods. Direct and indirect methods: unrestricted search; dichotomous search; golden section method; quadratic interpolation; Newton's procedures.
4. Extrema of functions of several variables.
5. Multidimensional Minimisation Problems - direct methods such as: Taxi-cab; conjugate search procedure
6. Multidimensional Minimisation Problems - indirect methods such as: Steepest descent method; Newton's method.
7. Linear Programming - the Simplex Method

Intended Learning Outcomes:
Technical Outcomes
Upon completion of the module the student should:
- Understand and be able to set up and carry out the necessary calculations for univariate unimodal optimisation problems LO1)
- Be able to use search techniques to determine the optima of unconstrained and constrained multivariable systems (LO2)
- Understand and be able to set up and carry out the necessary calculations for Linear Programming problems (LO3)

Accreditation Outcomes (AHEP)
- Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of engineering problems (SM2m)
- A comprehensive knowledge and understanding of mathematical and computational models relevant to the engineering discipline, and an appreciation of their limitations (SM5m)
- Understanding of concepts from a range of areas, including some outside engineering, and the ability to evaluate them critically and to apply them effectively in engineering projects (SM6m)
- Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods (EA7M)
- Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations (D10M)

Assessment: Examination 1 (80%)
Coursework 1 (10%)
Coursework 2 (10%)

Assessment Description: Exam - 80%
Coursework - 2 separate pieces which involve a selection of problems which utilise the optimisation methods taught. 20%

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback:
Examination - Standard Faculty of Science and Engineering exam feedback form.

Failure Redemption: A supplementary examination will form 100% of the module mark.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

This module assumes good mathematical skills and students will be expected to demonstrate a good understanding of partial differentiation, Taylor series expansion and matrices.

Failure to sit an examination or submit work by the specified date will result in a mark of 0% being recorded.

This module operates with a zero tolerance penalty policy for late submission of all coursework and continuous assessment.

Additional notes: Office hours, lecture notes and other teaching materials will be posted on Canvas.

EG-M194 MSc Industrial Experience Preparation

Credits: 0 Session: 2023/24 Academic Year

Pre-requisite Modules: EG-M39

Co-requisite Modules:

Lecturer(s): Dr V Samaras

Format: 11 hours consisting of a mix of seminars and workshops. 11 one hour drop-in advice sessions. Review of CV and cover letter.

Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

This module is delivered through directed and self-directed learning, careers resources, interactive workshops, reflective learning practice and drop-in advice sessions. The module is delivered on the Bay Campus.

Module Aims: This module aims to prepare students for the 60 credit industrial experience module - EG-M39 MSc Industrial Experience
which is required as part of the MSc with Industry programmes.

Preparation will include meetings with the assigned academic staff member who will act as supervisor for the industrial experience module and they will guide students via weekly interactions.

Module Content: NA

Intended Learning Outcomes: Technical Outcomes
By the end of this module, students will:
- Know how to find and apply for placements, create a CV and complete a placement application.
- Understand the interview process and gain interview experience.
- Discuss and share what is expected within the workplace including behavioural and professional conduct.
- Identify personal employability skills and how these will be used in a workplace setting.

Accreditation Outcomes (AHEP)
- Plan and carry out a personal programme of work, adjusting where appropriate (G3)
- Plan self-learning and improve performance, as the foundation for lifelong learning/CPD (G2)

Assessment: Participation Exercise (100%)

Assessment Description: Pass/Fail for engagement.

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: N/A: students will however be able to discuss and seek feedback/advice on their search for an industrial placement,
during the drop-in sessions

Failure Redemption: NA

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

This module is only available to students undertaking one of the 2-year MSc schemes "with industry" within the Faculty of Science and Engineering.

This module is non-credit bearing and has no assessments, instead it aims to prepare students for the 60 credit industrial experience module - EG-M39 MSc Industrial Experience which is required as part of the MSc with Industry programmes.

EG-M23 Finite Element Computational Analysis

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules: EG-323

Co-requisite Modules:

Lecturer(s): Prof R Sevilla

Format: Lectures 2h per week
Example Classes 1h per week
Directed private study 3h per week

Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

The module is delivered by lectures and example classes.

A comprehensive set of notes and a list of exercises will be are available for download via Canvas before the start of the course.

Communication and course announcements, including office hours details, will be made via Canvas.

Course materials, including the course notes and links to relevant webpages, will be available for download from Canvas.

Module Aims: This module introduces the fundamentals of the Finite Element Method to enable the student to use it in the solution of a range of problems of engineering interest. The classes of engineering problems covered in this module include elastic analysis of structures, heat conduction problems, seepage flow through soils and ideal fluid flow. In this context, MATLAB sample programs will be provided to illustrate the structure of a finite element software capable of solving these classes of problems.

Module Content:

- Review of the Finite Element Method for 1D elasticity and steady-state heat transfer
- Isoparametric finite elements
- High-order finite elements
- Numerical integration. Gaussian quadratures
- 2D heat transfer
- Seepage flow
- Irrotational flow.
- Quadrilateral elements
- 2D high-order finite elements
- Mesh generation
- Error measures
- 2D elasticity (plane stress, plane strain and axisymmetric problems)
- 3D elasticity
- Transient heat transfer
- Dynamics

Intended Learning Outcomes: Upon completion of this module students should be able to:
• Use the weighted residual method to solve an engineering problem governed by partial differential equations.
• Convert a realistic elasticity, heat conduction, seepage flow and ideal fluid flow engineering problems into finite element models.
• Solve elasticity, heat transfer, seepage flow and ideal fluid flow problems by hand using the finite element method.
• Use a software to set up and produce finite element solutions of engineering problems.
• Analyse/assess the output of finite element simulations.

Accreditation Outcomes (AHEP)

MEng
SM1 scientific principles and methodology necessary to underpin their education in their engineering discipline, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
SM2m Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems
SM3m Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline and the ability to evaluate them critically and to apply them effectively
SM4m Awareness of developing technologies related to own specialisation
SM5m A comprehensive knowledge and understanding of mathematical and computational models relevant to the engineering discipline, and an appreciation of their limitations
SM6m Understanding of concepts from a range of areas, including some outside engineering, and the ability to evaluate them critically and to apply them effectively in engineering projects
EA1m Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes
EA2i Ability to apply quantitative methods in order to understand the performance of systems and components
EA3m Ability to apply quantitative and computational methods, using alternative approaches and understanding their limitations, in order to solve engineering problems and implement appropriate action
EA4 Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems
EA6m Ability to extract and evaluate pertinent data and to apply engineering analysis techniques in the solution of unfamiliar problems
P1 Understanding of contexts in which engineering knowledge can be applied (for example operations and management, application and development of technology, etc.)
P3 Ability to apply relevant practical and laboratory skills
P4 Understanding of the use of technical literature and other information sources
P9m A thorough understanding of current practice and its limitations, and some appreciation of likely new developments
P11m Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader
G1 Apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3m Monitor and adjust a personal programme of work on an on-going basis
G4 Exercise initiative and personal responsibility, which may be as a team member or leader

MSc
SM1m A comprehensive understanding of the relevant scientific principles of the specialisation.
SM2m A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of the specialisation.
SM3m Understanding of concepts relevant to the discipline, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects.
EA1m Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations
EA3m Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods.
D1m Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the

effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies
P2m A thorough understanding of current practice and its limitations, and some appreciation of likely new developments.
P4m Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
G3 Monitor and adjust a personal programme of work on an on-going basis.

Assessment: Examination 1 (60%)
Assignment 1 (40%)

Assessment Description: - Examination (60% of the module marks)
Standard university examination (open book).

- Assignment (40% of the module marks)
Group assignment where students are required to choose one of the following options:
1. Create a finite element model using commercial software to solve a realistic engineering problem in solid or fluid mechanics.
2. Modify an existing MATLAB program to solve an engineering problem using finite elements.

(*) Option 1 will require students to have access and to independently learn how to use the commercial software ANSYS.
To support this task, students will have access to
- online resources
- support from the Math and CAE Cafe offered by the College of Engineering.

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback:
Examination - Standard university exam feedback form.

Assignment - Comments on submitted work will be sent to the groups.

Failure Redemption: Exam re-sits according to University regulations. A supplementary exam will form 60% of the module marks, with remaining 40% coming from the previously submitted coursework element.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Penalty for late submission of continual assessment assignment: No marks awarded for late submissions.

Available to visiting and exchange students.

This module requires a prior knowledge of:
1. Basic Finite Elements - more specifically, knowledge of the content of the module EG-323 is assumed.
2. Computer programming - more specifically, MATLAB programming language - at a fairly basic level.

EG-M47 Business Leadership for Engineers

Credits: 10 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s):

Format: Lectures/Workshops - 22 hours
Open door tutorials/workshops - 8 hours
Directed private study 70 hours
Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Combination of interactive lectures/workshops/case studies and self-study.

Module Aims: At the end of this course students will be able to recognise and understand key characteristics of leadership as well as a wide range of strategic business skills, ideas and theories with emphasis on innovation and "entrepreneurial thinking" which is essential for the current multidisciplinary engineering environment. The course delivery integrates practical project work and academic rigour.

Module Content: Workshop 1 – Introduction & Leadership Part 1
Workshop 2 – Leadership Part 2
Workshop 3 – Team Formation, Development and Communication
Workshop 4 - Entrepreneurial Thinking
Workshop 5 – Change Management
Workshop 6 – Strategic Management
Workshop 7 – Innovation and Business Thinking, Group Assignment Part 1
Workshop 8 – Innovation and Business Thinking, Group Assignment Part 2
Workshop 9 – Group Assignment Workshop
Workshop 10 – Group Assignment Workshop

Intended Learning Outcomes:
Technical Outcomes
On successful completion of this module students will be expected, at threshold level, to be:
- Demonstrate an understanding of current leadership issues. Critically appraise theories and approaches to leadership and at the same time reflect on personal leadership aspects.
- Knowledge to assess the basic factors that must be considered for a business formation. Use of basic level strategy and innovation methods in order for an organisation to gain competitive advantage. Critically evaluate the rationale for utilising methods for idea generation/innovation.
- Have awareness of theoretical perspectives and approaches to change management in organisational environments. Synthesise the relationship between the external context of an organisation and its internal context and their impact on its strategic direction.
- Demonstrate and appraise, entrepreneurial way of working, team development and communication skills

Accreditation Outcomes (AHEP)

- Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards (D2)
- Demonstrate the ability to generate an innovative design for products, systems, components or processes to fulfil new needs (D8m)
- Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of the particular specialisation, (ET3fl)
- Awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate, (ET4fl)
- Awareness of and ability to make general evaluations of risk issues in the context of the particular specialisation, including health & safety, environmental and commercial risk. (ET6fl)
- Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction. (ET7m)

Assessment: Group Work - Coursework (80%)
Online Class Test (10%)
Online Class Test (10%)

Assessment Description: Online Test 1 Assessment level marking - PGTM March 10%
Online Test 2 Assessment level marking - PGTM March 10%
Group Work Coursework Assessment level marking - PGTM April 80%

The group (5/6) assignment will require application of the "key skills" and innovation development tools to generate solutions for real-world scenarios – report (40 pages) and development of Business Canvas.

This module is assessed by a combination of group-based and individual assignments (quiz-1 and quiz-2). In the main exam, the marks students get in quiz -1 and quiz-2 will add to the marks the individual gets in the group assignment project. For the resit exam, the quiz-1 and quiz-2 marks will not add to the project.

Moderation approach to main assessment: Partial moderation

Assessment Feedback:
Continuous group feedback on "out-comes" of workshops, after submission of coursework 1 at request during open-tutorials.

Failure Redemption:
Exam resits according to University regulations.
100% coursework.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

The Faculty of Science and Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment

Related assignments are used to assess this module.

This module is assessed by a combination of group-based and individual assignments. In order for the individual assessment marks to count, you must achieve at least 40% in the group-based assignment. If you achieve less than 40% in the group-based assignment, then the module mark will be just the group-based assignment mark.

EGEM03 Continuum Mechanics

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof D Peric

Format: Lectures 24hrs in semester
Example classes 12hrs in semester
Directed private study 36hrs in semester

Delivery Method: Additional notes:
Failure to attend activities that are a module requirement will normally mean that you cannot sit the final exam in the module.
University regulations will apply for late submissions of the projects

Module Aims: This module is concerned with the fundamentals of solid mechanics with particular attention given to elastic solids.
Generic continuum mechanics concepts are introduced including basic geometric relations, balance principles and constitutive theory. This provides a basis for approximation methods and finite element method, in particular.
Solution techniques of classical elasticity are employed in the solution of several engineering problems, including torsion of cylindrical bars and two-dimensional problems of elasticity.

Module Content: Attendance is a course requirement. Each student will need to complete three small projects that will require hand calculation.

Elements of Tensor Algebra: Points. Vectors. Tensors: Definitions and Notation.Spectral Theorem; Principal Invariants; Cayley-Hamilton Theorem. [3]
Elements of Tensor Analysis: Differentiaton; Gradient. Divergence. Curl; Green's Formulae; Divergence Theorem. Stoke's Theorem. [4]
Geometry and Kinematics of Bodies: Deformation of Bodies: Displacement. Green-Lagrange Strain Tensor; Infinitesimal Strain and Rotation. Properties of the Strain Tensor. Normal and Shear Strains. [4]
Balance Principles: Linear and Angular Momentum Balance. The Stress Tensor. Local Equations of Equilibrium. Symmetry of the Stress Tensor; Properties of the Stress Tensor. Principal and Deviatoric Stresses; The Principle of Virtual Work. [3]
Constitutive Theory: The Principle of Energy Balance - The First Law of Thermodynamics; Strain Energy Function; Generalised Hooke's Law. The Elasticity Tensor; Isotropic Linear Elasticity: Constitutive Equations. Lame Coefficients. The Matrix Formulation. [4]
The Boundary Value Problems of Linear Elasticity: Summary of Field Equations; Navier's Equations; Beltrami-Mitchells Compatibility Conditions; Formulation of the BVP; Uniqueness of Solution; Solution of Selected Problems: Torsion of a Cylindrical Bar; The Plane Problem of Elasticity: Problem Description. State of Plane Strain. State of Plane Stress. Characterisation of the Stress Field. Airy's Solution. Formulation in Polar Coordinates. [12]

Intended Learning Outcomes: Students should be able to:
- Learn and understand fundamentals of solid mechanics with applications to elasticity.
- Formulate engineering problems in solid mechanics by considering geometry, equilibrium and constitutive theory.
- Develop practical skills related to tensor calculus.
- Perform analysis of torsion of arbitrary cross-section.
- Perform analysis of 2-D plane strain and plane stress engineering problems.
- Appreciate difficulties in obtaining the closed form solution in solid mechanics, and realise the necessity for approximation techniques.
- Develop a sound basis for approximation methods and finite element method, in particular.

Learning Outcomes (AHEP)
SM1m A comprehensive understanding of the relevant scientific principles of the specialisation.
SM2m A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of the specialisation.
EA1m Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations
P1m Advanced level knowledge and understanding of a wide range of engineering materials and components.

Assessment:	Examination 1 (70%) Coursework 1 (10%) Coursework 2 (10%) Coursework 3 (10%)

Assessment Description: Examination 1 - Standard 2 hour university examination worth 70% of the final mark. Exam question related to the solution of a boundary value problem is a closed book question. For the remainder of the exam the use of lecture notes and worked exercises is permitted.
Coursework 1, 2 and 3 - Each students will need to complete three individual assignments that will require hand calculation. Each assignment will contribute 10% of the final mark, making assignments worth 30% of the final mark.

Moderation approach to main assessment: Universal Double Blind Marking of the whole cohort

Assessment Feedback: Examination 1 - Standard university exam feedback form.

Coursework 1, 2 and 3 - Marked assignments with comments will be provided to students for inspection.

Failure Redemption: Normally, supplementary examination will form 100% of the module mark.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Failure to attend activities that are a module requirement will normally mean that you cannot sit the final exam in the module.

Zero tolerance will apply for late submissions of the assignments.

Failure to sit an examination or submit work by the specified date will result in a mark of 0% being recorded.

EGEM07 Fluid-Structure Interaction

Credits: 10 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof WG Dettmer

Format: Lectures and example classes: 30 hours

Directed private study and revision: 70 hours

Contact Hours will be delivered through a blend of live activities online or on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus.

This module is based on lectures and on-line example classes supported by additional on-line content.

Module Aims: The understanding and the computer simulation of fluid-structure interaction (FSI) is of increasing importance in
many areas of modern engineering including Civil, Aerospace and Mechanical Engineering. In this module, various phenomena, such as divergence, roll stability of floating bodies, vortex-induced vibrations, galloping and flutter, oscillating pipes and wind turbines, are studied and a number of basic numerical solution strategies are developed. In the context of high-fidelity finite element or finite volume based computational strategies, the module focuses on the challenges arising from the strong coupling between the fluid flow and the solid structure.

Module Content: FSI phenomena and instabilities:
• hydrostatic pressure, lift and drag forces, pitching moment,
• structural divergence,
• added mass,
• oscillating pipes,
• water hammer,
• roll stability of floating bodies,
• vortex-induced vibration, lock-in,
• galloping and flutter,
• wind turbines

Computational FSI:
• Blade Element Momentum theory for wind turbines,
• 1D finite element models for divergence and oscillating pipes,
• general concepts for spatial and temporal discretisation,
• Gauss-Seidel iteration, relaxation, convergence, Aitken acceleration,
• numerical added mass instability

Intended Learning Outcomes: Upon successful completion of this module, students will be expected, at threshold level, to be able to:
• assess the stability of different FSI systems (assessed in the assignment and in the exam, SM1, EA2),
• develop numerical solution methods for basic FSI problems (assessed in the assignment, EA1, EA2, EA3),
• assess the suitability of computational strategies for different FSI problem classes (assessed in the exam, EA4).

Assessment: Examination 1 (70%)
Assignment 1 (10%)
Assignment 2 (10%)
Assignment 3 (10%)

Assessment Description: Examination:
The examination forms 70% of the module mark.

Assignments 1, 2 and 3: Examples and Applications
These are individual pieces of coursework to be completed on-line. Each is worth 10% of the module mark.

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: Examination:
A general pro-forma is completed, covering errors/issues that were identified during the marking process, and produced as formal examination feedback.

Assignments 1, 2 and 3:
General feedback on the assignment will be given in a lecture.
Individual feedback will be given in office hours.

Failure Redemption: A supplementary examination will form 100% of the module mark.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

The Faculty of Science and Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment.

Lecture notes, Matlab code, examples, exercises, worked solutions and past examination papers will be available on Canvas.

EGIM02 Advanced Computational Methods for Engineers

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules: EG-228; EG-399

Co-requisite Modules:

Lecturer(s): Dr F Zhao

Format: Synchronous / Lectures 20h
Asynchronous & Directed Private Study 80h

Contact Hours will be delivered through a blend of live activities online and on-campus, and may include, for example, lectures, seminars, practical sessions and Academic Mentoring sessions.

Delivery Method: All Programmes will employ a blended approach to delivery using the Canvas Digital Learning Platform for live and self-directed online activity, with live and self-directed on-campus activities each week. Students may also have the opportunity to engage with online versions of sessions delivered on-campus

Online based lectures and example classes, the course material will be available for download from Canvas.
Assessment: 30% continuous assessment assignments, 70% closed book examination.
Practical Work: Exercises/project will involve coding some of the methods presented in MATLAB.

Module Aims: Introduction to advanced computational (numerical) methods including ordinary and partial differential equations at masters level. The course provides an understanding of fundamental methods that form the basis of common solution techniques used in many simulators and commercial packages with wide application in science and engineering.

Module Content:

- Review of Basic Numerical Methods.
- Newton's method
- Numerical Integration
- Discretization of Ordinary Differential Equations
- Discretization of Partial Differential Equations
- (All Types Elliptic, Hyperbolic and Parabolic)
- Finite difference and Finite volume methods
- Consistency, stability and convergence
- An Introduction to the Solution of Linear Systems
- Gaussian elimination
- Relaxation methods

Practical Work: Exercises/project will involve coding some of the methods presented in MATLAB
NOTE: Knowledge of some MATLAB or scientific programming is assumed.

Intended Learning Outcomes: Technical Outcomes
Demonstrate a knowledge and understanding of:
• The basic principles of: numerical integration, numerical solution of ordinary and partial differential equations. Truncation error and solution error. Consistency, stability and convergence. Direct and iterative solution of Linear systems of equations.
• Demonstrate the ability to (thinking skills): Understand and formulate basic numerical procedures and solve fundamental problems.
• Demonstrate the ability to (practical skills): Understand practical implications and behaviour of numerical methods and their solutions. Logically formulate numerical methods for solution by computer with MATLAB.
• Demonstrate the ability to (key skills): Study independently, use library resources. Effectively take notes and manage working time.

Accreditation Outcomes (AHEP)
- A comprehensive knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies (SM1m)
-Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of engineering problems (SM2m)
- Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline and the ability to evaluate them critically and to apply them effectively (SM3m)
- A comprehensive knowledge and understanding of mathematical and computational models relevant to the engineering discipline, and an appreciation of their limitations (SM5m)
- Understanding of concepts from a range of areas including some outside engineering, and the ability to evaluate them critically and to apply them effectively in engineering projects (SM6m)

Assessment: Examination (70%)
Assignment 1 (30%)

Assessment Description: Assessment is comprised of a closed book examination (70%) and 1 assignment (30%) involving analysis and computation.

Assignment. Questions on key components and concepts of the course material covered during the semester.

The examination and assessments tests knowledge and understanding of all the material presented.

Formative exercises are also set each week which also involve questions on key components and concepts of the course material to aid and reinforce learning and understanding.

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: Feedback on assessed work is given in example classes and via canvas.
Feedback on formative exercises is also given in example classes.
Specific issues and questions are answered throughout the module including example classes.
Feedback on formal examinations is given via a web feedback template.

Failure Redemption: The supplementary closed book exam paper is sat during the month of August following the first exam sat in January.
A supplementary examination will normally form 100% of the module mark and is capped at 50%.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

Lecture notes provided.

Failure to sit an examination or submit work by the specified date will result in a mark of 0% being recorded.

Students must have completed Year 1 maths modules and EG-228 matlab or equivalent in order to take this module.

EGIM06 Computational Fluid Dynamics

Credits: 10 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof P Nithiarasu

Format: Lectures and examples 30 hours.

Delivery Method: A total of 30 hours of lectures and examples. Two individual mini-projects on the implementation of computational fluid dynamics algorithms.
Assessment: Written closed-book examination (70%), projects (30%).
Penalty for late submission of continuous assessment assignment:
No marks awarded for late submissions.
Directed private study: 30 hours
Private laboratory work: 12 hours

Module Aims: This module provides a concise overview on the basic principles of computational fluid mechanics. The topics include finite difference and finite element methods, compressible and incompressible flows. Training will also be provided on the implementation of computational fluid dynamics algorithms.

Module Content: Introduction to CFD [1]
CFD model and applications [1]
Navier-Stokes equations [2]
Mathematical nature of equations [3]
Examples [2]
Spatial and temporal discretizations and examples [4]
Mini-project briefs [1]
Finite difference and finite volume schemes and examples [4]
Finite element schemes and examples [4]
Stabilized solution algorithms and examples [4]
Advanced topics [2]
Review and assessment [2]

Computer laboratory work: associated with mini-projects.
Project work: Mini-projects on computer implementation.

Intended Learning Outcomes: At the end of the module the student should be able to;
• Apply the knowledge of fluid dynamics equations, including initial and boundary condition, spatial and temporal discretizations and relevant mathematical aspects to the solution of practical fluid dynamic problems.
• To identify and evaluate the key issues relevant to discretization both in space and time.
• Create a computer code using any one programming language to solve fluid dynamic problems.
• Use computer codes to produce correct solutions.

Learning Outcomes (AHEP)
SM1m A comprehensive understanding of the relevant scientific principles of the specialisation.
SM2m A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of the specialisation.
SM3m Understanding of concepts relevant to the discipline, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects.
EA1m Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations
EA2m Ability to use fundamental knowledge to investigate new and emerging technologies.
EA3m Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods.
D1m Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
G3m Monitor and adjust a personal programme of work on an on-going basis.

Assessment:	Examination 1 (70%) Assignment 1 (15%) Assignment 2 (15%)
Assessment Description: (i) Mini-project 1: Computer implementation of finite difference schemes (15%). (ii) Mini-project 2: Computer implementation of a finite element scheme (15%). (iii) Final examination: Closed book exam (70%).	
Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit	
Assessment Feedback: Feedback given on mini-projects 1 and 2. A overall feedback on the final examination will be posted online.	
Failure Redemption: Resit may be allowed in exceptional circumstances - subject to university regulations. Assessment - 100% examination.	
Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus. Penalty for late submission of continuous assessment assignment: No marks awarded for late submission. Failure to sit an examination or submit work by the specified date will result in a mark of 0% being recorded.	

EGIM07 Dynamics and Earthquake Analysis of Structures

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules: EG-260

Co-requisite Modules:

Lecturer(s): Prof Y Feng

Format: Lectures & Example classes (30h); Directed private study (30h)

Delivery Method: Mixture of online lectures (live + recorded), face-to-face activities and unscheduled one-to-one (online) tutorials

Module Aims: This module aims to develop the understanding and skills necessary to analyse linear structures under general dynamic, including earthquake loading, and to understand the use of time stepping schemes for linear dynamic and transient problems.

Module Content:

• Introduction: Dynamic effects on structures, Engineering disasters, design issues. [1]

• Single Degree of Freedom Problems (SDOF): the SDOF spring-mass system, equivalent SDOF structures - energy method, analytical solution of SDOF problems, step by step solution methods, earthquake loading, response and design spectra, Eurocode- 8 elastic spectrum. [15]

• Multiple Degree of Freedom Problems: natural modes and frequencies of vibration, modal decomposition, reduction methods, earthquake loading, shear building model, design considerations. [9]

• Distributed Mass Systems: finite element discretisation and formulations. [4]

• Revision [1]

Intended Learning Outcomes: On the completion of the module, students are expected to be able to:

• Evaluate potential disastrous consequences of structural failures under dynamic loadings, such as strong wind, wave and particularly earthquakes.
• Apply the Rayleigh method to simplify a complex structure to a SDOF system; perform earthquake analysis of SDOF systems and apply knowledge of basic dynamic concepts of SDOF systems such as dynamic magnification, resonance and damping.
• Follow Eurocode-8 to conduct elastic earthquake analysis of a regular-shaped multi-story frame structure.
• Use a computer language to analyse the accuracy and stability of the Newmark integration method, and generate an earthquake spectra, based on which to conduct an earthquake analysis of a multi-story building.
• Determine Rayleigh vibration shape functions for simple structures.
• Distinguish between stiffness/mass/damping-dominated problems.
• Identify dynamic loading on bridges, footbridges, floors, etc. resulting from moving loads or rhythmic activities.

AHEP3 Learning Outcomes

MEng
EA1m Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes
EA2 Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques
EA4 Understanding of, and the ability to apply, an integrated or systems approach to solving complex engineering problems.
D6 Communicate their work to technical and non-technical audiences.
EL4 Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate.
P4 Understanding of the use of technical literature and other information sources.
P6 Understanding of appropriate codes of practice and industry standards.
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities.
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.

MSc
SM1m A comprehensive knowledge and understanding of the scientific principles and methodology necessary to underpin their education in their engineering discipline, and an understanding and know-how of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
SM2m Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems
SM3m Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline and the ability to evaluate them critically and to apply them effectively
EA1m Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes
EA2 Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques
P2m Knowledge of characteristics of particular equipment, processes or products, with extensive knowledge and understanding of a wide range of engineering materials and components
G1 Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3m Monitor and adjust a personal programme of work on an on-going basis

Assessment: Examination 1 (40%)
Project (60%)

Assessment Description: Exam - 40%

Project - 60%

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: Offer one-to-one sessions to discuss the student's individual project; and use the College's standard module feedback procedure to provide the students with issues associated with the final examination.
Failure Redemption: 1. Students can redeem their failure by taking a supplement exam in August. 2. If students passed the exam component, but failed the individual project, the students have an option to redo the project without taking the supplementary exam.
Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus. Assessment: Written, open book, examination (2 hrs) at the end of Semester 1 accounts for 60% of the marks, the remaining 40% are awarded to an individual project, for which students are expected to solve a dynamical problem using Excel/Matlab etc and write a technical report on their findings. Penalty for late submission of course work is zero mark in the course work. The detail of the individual project will be provided at the beginning of the course.

EGIM10F Communications skills in a foreign language - French

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof R Sevilla, Prof AJ Rothwell

Format: Lecture hours: 3 hours per week
Directed private study and preparation for assessment: 2 hours per week

Delivery Method: - Based on campus.
- Lecture/seminar.

Module Aims: In this module, students will be exposed to basic communication skills in French. This module is designed for students with little or no previous knowledge of the chosen foreign language.

The aim of the module is to enable students to acquire a basic vocabulary and an understanding of fundamental grammatical structures so as to allow them to communicate in a written and spoken manner. Students will also acquire awareness of contemporary foreign culture from the range of materials used.

Module Content: This module is designed for students with little or no previous knowledge of the French language. Its aim is to enable students to acquire a basic vocabulary and an understanding of fundamental grammatical structures so as to allow them to communicate in written and spoken French. Students will also acquire awareness of contemporary French culture from the range of materials used. Students wishing to pursue further study of French will be able to do so on completion of this module by taking MLF102.

The module will follow the 12 unit study programme of Voilà and will be supplemented by extra grammar exercises and oral / aural tasks produced in-house or available on recommended websites.

Intended Learning Outcomes: By the end of this module students should be able to:

- Demonstrate awareness of French vocabulary appropriate to a range of everyday situations (assessed in oral and vocabulary examination).
- Demonstrate a knowledge of the fundamentals of French grammar (assessed in oral, written and grammar examination).
- Express themselves orally in French in general conversational situations (assessed in oral examination).
- Express themselves in written French with reference to everyday situations (assessed in written examination).
- Demonstrate a knowledge of contemporary French culture through familiarity with a range of print and media resources.

Accreditation Outcomes (AHEP)
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
G3m Monitor and adjust a personal programme of work on an on-going basis.

Assessment: Examination (100%)

Assessment Description: Class Test 1
Coursework
Oral Examination
Examination

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: - Individual feedback will be given on all submitted coursework via direct written feedback information.
- Examination feedback will be provided using the The Faculty of Science and Engineering on-line feedback system, with
general information provided on examination performance in each question and statistics on overall class performance

Failure Redemption: In compliance with The Faculty of Science and Engineering progression regulations any student failing to pass in the June examination period may be invited to sit a supplementary examination in August of the same year, at the discretion
of the Erasmus Mundus Board of Studies.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

- The The Faculty of Science and Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment.
- Available to Erasmus Mundus MSc in Computational Mechanics students.

EGIM10G Communications skills in a foreign language - German

Credits: 10 Session: 2023/24 September-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof R Sevilla, Prof AJ Rothwell

Format: Lecture hours: 3 hours per week
Directed private study and preparation for assessment: 2 hours per week

Delivery Method: - Based on campus.
- Lecture/seminar.

Module Aims: In this module, students will be exposed to basic communication skills in German. This module is designed for students with little or no previous knowledge of the chosen foreign language.

The aim of the module is to enable students to acquire a basic vocabulary and an understanding of fundamental grammatical structures so as to allow them to communicate in a written and spoken manner. Students will also acquire awareness of contemporary foreign culture from the range of materials used.

Module Content: Students following this module will have four contact hours per week.

The course book Passwort 1 will be used, and the module will cover activities from chapters 1-6.
The grammar points covered are tenses (present, simple past and present perfect) conjugations, the cases (nominative and accusative), modal verbs, syntax rules, prepositions and simple negations

The classes will be conducted mainly in German.

Intended Learning Outcomes: By the end of this module students should be able to:

- Demonstrate awareness of German vocabulary appropriate to a range of everyday situations (assessed in oral and vocabulary examination).
- Demonstrate a knowledge of the fundamentals of German grammar (assessed in oral, written and grammar examination).
- Express themselves orally in German in general conversational situations (assessed in oral examination).
- Express themselves in written German with reference to everyday situations (assessed in written examination).
- Demonstrate a knowledge of contemporary German culture through familiarity with a range of print and media resources.

Accreditation Outcomes (AHEP)
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
G3m Monitor and adjust a personal programme of work on an on-going basis.

Assessment: Examination (100%)

Assessment Description: Class Test 1 - Held under exam conditions
Oral Examination
Examination 1

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: - Individual feedback will be given on all submitted coursework via direct written feedback information.
- Examination feedback will be provided using the The Faculty of Science and Engineering on-line feedback system, with general information provided on examination performance in each question and statistics on overall class performance

Failure Redemption: In compliance with College of Engineering progression regulations any student failing to pass in the June
examination period may be invited to sit a supplementary examination in August of the same year, at the discretion of the Erasmus Mundus Board of Studies.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

- The The Faculty of Science and Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment.
- Available to Erasmus Mundus MSc in Computational Mechanics students.

EGIM10S Communications skills in a foreign language - Spanish

Credits: 10 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof R Sevilla, Mrs TA May

Format: Lecture hours: 3 hours per week
Directed private study and preparation for assessment: 2 hours per week

Delivery Method: - Based on campus.
- Lecture/seminar.

Module Aims: In this module, students will be exposed to basic communication skills in Spanish. This module is designed for students with little or no previous knowledge of the chosen foreign language.

The aim of the module is to enable students to acquire a basic vocabulary and an understanding of fundamental grammatical structures so as to allow them to communicate in a written and spoken manner. Students will also acquire awareness of contemporary foreign culture from the range of materials used.

Module Content: 1. The alphabet
2. Pronunciation.
3. Nouns & agreements
4. Adjectives & prepositions
5. Grammatical persons
6. The present tense of regular verbs
7. The present tense of irregular verbs
8. Stem changing present tense verbs
9. Numbers
10. Future tense

Intended Learning Outcomes: By the end of this module students should be able to:

- Demonstrate awareness of Spanish vocabulary appropriate to a range of everyday situations (assessed in oral and vocabulary examination).
- Demonstrate a knowledge of the fundamentals of Spanish grammar (assessed in oral, written and grammar examination).
- Express themselves orally in Spanish in general conversational situations (assessed in oral examination).
- Express themselves in written Spanish with reference to everyday situations (assessed in written examination).
- Demonstrate a knowledge of contemporary Spanish culture through familiarity with a range of print and media resources.

Accreditation Outcomes (AHEP)
G1 Ability to apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
G3m Monitor and adjust a personal programme of work on an on-going basis.

Assessment: Examination (100%)

Assessment Description: Oral Examination
Class Test 1 - Held under exam conditions
Examination 1

Moderation approach to main assessment: Moderation of the entire cohort as Check or Audit

Assessment Feedback: - Individual feedback will be given on all submitted coursework via direct written feedback information.
- Examination feedback will be provided using The Faculty of Science and Engineering on-line feedback system, with general information provided on examination performance in each question and statistics on overall class performance

Failure Redemption: In compliance with The Faculty of Science and Engineering progression regulations any student failing to pass in the June
examination period may be invited to sit a supplementary examination in August of the same year, at the discretion of the Erasmus Mundus Board of Studies.

Additional Notes: Delivery of both teaching and assessment will be blended including live and self-directed activities online and on-campus.

- The Faculty of Science and Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment.
- Available to Erasmus Mundus MSc in Computational Mechanics students.