Swansea University
Prifysgol Abertawe

FACULTY OF SCIENCE AND ENGINEERING

UNDERGRADUATE STUDENT HANDBOOK

FOUNDATION (FHEQ LEVEL 3)

FOUNDATION PHYSICS

DEGREE PROGRAMMES

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)	Dr Laura Roberts
School of Biosciences, Geography and Physics	
Head of School	Dr Kevin Rees
School Education Lead	Dr Wendy Harris and Dr Sarah Roberts
Head of Physics	Dr Daniel Thompson and Professor Prem Kumar
Physics Programme Director	Dr Tim Burns
Year Coordinators	Head of Foundation Year: Dr Warren Perkins Head of Level 1: Dr Aled Isaac Head of Level 2: Dr Dave Dunbar Head of Level 3: Dr Sophie Shermer Head of Level M: Dr Kevin O'Keeffe

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/

Year 0 (FHEQ Level 3) 2023/24
Physics
BSc Physics[F301]

Semester 1 Modules	Semester 2 Modules
PH-021 **Mechanics** **20 Credits** **Dr WA Bryan**	**PH-024** **Waves, Optics and Thermal Physics** **20 Credits** **Dr EI Zavala Carrasco**
PH-022 **Electricity and Magnetism** **20 Credits** **Prof G Tasinato**	**PH-025** **Atoms, Nuclei and Particles** **20 Credits** **Prof N Madsen/Dr SM Shermer**
PH-023 **Foundation Mathematics for Physicists I** **20 Credits** **Dr WB Perkins**	**PH-026** **Foundation Mathematics for Physicists II** **20 Credits** **Dr SG Roberts**
Total 120 Credits	

PH-021 Mechanics

Credits: 20 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr WA Bryan

Format: Lectures - 22 hours (2 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: Lectures and Feedback session delivered by a blended approach using where appropriate a combination of asynchronous and synchronous delivery. Synchronous delivery typically online and, where appropriate, in-person.

Module Aims: An introduction to forces, motion and Newton's Laws, without calculus.

Module Content: Basics
- Units
- Homogeneity of equations
- Significant figures

Forces
- Types of forces
- Dissipative forces
- Lift
- Free-body diagrams
- Pressure

Turning effects of forces
- Moments
- Equilibrium
- Couples
- Centre of mass

Motion
- Speed, velocity and acceleration
- Displacement-time graphs
- Velocity-time graphs
- Equations of motion
- Falling under gravity
- Terminal velocity
- Projectile motion

Newton's Laws and momentum
- First Law, inertia
- Second Law, momentum
- Third Law, pairs of forces
- Impulse
- Conservation of momentum

Work, energy and power
- Kinetic and potential energy
- Conservation of energy
- Efficiency
- Kinetic energy and momentum
- Elastic and inelastic collisions

Circular motion
- Radians
- Centripetal force and acceleration
- Horizontal and vertical circular motion

Gravitational forces and fields
- Inverse-square law
- Gravitational field, satellites
- Gravitational potential
- Kepler's laws
- Escape velocity

Simple harmonic motion
- Oscillations, period, frequency
- Simple pendulum
- Mass on a spring
- Damping
- Resonance

Materials
- Density
- Crystal structure
- Size of atoms
- Hooke's law
- Elastic potential energy
- Stress and strain
- Young modulus
- Stress-strain graphs
- Yielding and breaking
- Polymers
- Tension and compression

Intended Learning Outcomes: Understanding the physical laws of forces and motion.

Ability to perform calculations and solve problems based on the content of this module. In particular:

- Forces
- Algebraic and graphical methods for motion
- Collisions and Newton's Laws
- Work, energy and power
- Circular motion
- Gravitational force
- Simple harmonic motion
- Elastic properties of materials

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment:	Examination 1 (50%) Coursework 1 (50%)
Resit Assessment:	Examination (Resit instrument) (100%)

Assessment Description: Coursework 1 50% weekly continuous assessment including workshop exercises

Examination 50% Final Assessment/Exam

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit if applicable.

Reading List: Jim Breithaupt author., Physics / Jim Breithaupt., London : Palgrave, 2015.ISBN: 9781137443236
John D. Cutnell, Kenneth W Johnson, Introduction to Physics / John D. Cutnell & Kenneth W. Johnson ; with contributions by Kent D. Fisher., Wiley, 2009.ISBN: 9780470409428
Keith Johnson 1938- author., Simmone Hewett author.; Sue Holt author.; John Miller author., Advanced physics for you / Keith Johnson, Simmone Hewett, Sue Holt, John Miller., Oxford : Oxford University Press, 2015.ISBN: 9781408527375

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

Available to visiting and exchange students.

PH-022 Electricity and Magnetism

Credits: 20 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof G Tasinato

Format: Lectures - 22 hours (2 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: Lectures and Feedback session delivered by a blended approach using where appropriate a combination of asynchronous and synchronous delivery. Synchronous delivery typically online and, where appropriate, in-person

Module Aims: Introduction to basic concepts in electricity and magnetism, including electrostatics, magnetostatics, electromagnetic induction, and electrical circuits.

Module Content: Current and charge
- Conductors and insulators
- Electric current
- Energy and potential difference
- Resistance
- Resistivity
- Electrical power

Electrical circuits
- Resistors in series and parallel
- Kirchhoff's Laws
- Potential divider
- Variable resistors and potentiometers
- e.m.f.~and internal resistance

Magnetic Fields
- Magnetic field of a current
- Magnetic materials
- Magnetic flux density
- Coils, solenoids, electromagnets
- Magnetic force on a wire
- Magnetic force on moving charges
- Magnetic force between currents

Electromagnetic induction
- Induction from coils
- Magnetic flux
- Faraday's Law
- Lenz's Law
- A.C. generator

Alternating current
- r.m.s values
- Oscilloscopes
- Transformers
- Rectifiers and diodes

Electric Fields
- Static charge
- Coulomb's Law
- Comparison to gravitational force
- Electric field
- Electric potential

Capacitors
- Capacitance
- Energy in a charged capacitor
- Capacitors in series and parallel
- Charge and discharge
- Time constant

Intended Learning Outcomes: Demonstrate an understanding of the physical laws of electricity and magnetism.

Ability to perform calculations and solve problems based on the content of this module. In particular:

- Current and resistance
- A.C. and D.C. circuits
- Magnetic fields
- Electric fields
- Electromagnetic induction
- Capacitance

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment:	Examination 1 (50%) Coursework 1 (50%)
Resit Assessment:	Examination (Resit instrument) (100%)

Assessment Description: Coursework 1 50% weekly continuous assessment including workshop exercises

Examination 50% Final Assessment/Exam

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit if applicable.

Reading List: Jim Breithaupt author., Physics / Jim Breithaupt., London : Palgrave, 2015.ISBN: 9781137443236
John D. Cutnell, Kenneth W Johnson, Introduction to Physics / John D. Cutnell & Kenneth W. Johnson ; with contributions by Kent D. Fisher., Wiley, 2009.ISBN: 9780470409428
Keith Johnson 1938- author., Simmone Hewett author.; Sue Holt author.; John Miller author., Advanced physics for you / Keith Johnson, Simmone Hewett, Sue Holt, John Miller., Oxford : Oxford University Press, 2015.ISBN: 9781408527375

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

Available to visiting and exchange students.

PH-023 Foundation Mathematics for Physicists I

Credits: 20 Session: 2023/24 September-January

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr WB Perkins

Format: Lectures - 22 hours (3 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: All teaching in person

Module Aims: Mathematics skills to complement the Foundation Year physics curriculum and prepare students for Level 1 physics.

Module Content: Vectors
Algebraic manipulation
Trigonometry
Coordinate geometry
Series
Exponentials and logarithms

Intended Learning Outcomes: Understanding of the fundamental mathematics required for introductory physics studies.

Ability to perform calculations and solve problems based on the content of this module.

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment: Examination 1 (50%)
Coursework 1 (50%)
Resit Assessment: Examination (Resit instrument) (100%)

Assessment Description: Coursework 1 – 50%
Examination – 50% - January - Final Assessment/Exam

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit if applicable.

Reading List: Jenny Olive 1939-, Maths : a student's survival guide / Jenny Olive., Cambridge University Press, 2003.ISBN: 9780521017077
Tony Croft 1957- author., Robert Davison (Math Professor) author., Foundation maths / Anthony Croft, Robert Davison., Harlow : Pearson Education Limited, 2020.ISBN: 9781292289731
Anthony Croft author., Robert Davison author., Foundation maths / Anthony Croft, Robert Davison., Place of publication not identified : Pearson Education Limited, 2019.ISBN: 1292289686
Tony Croft author., Robert Davison author., Foundation maths / Anthony Croft, Robert Davison., Harlow, England : Pearson Education Ltd, 2016.ISBN: 9781292095172
K. A. Stroud author., Dexter J. Booth author., Engineering mathematics / K.A. Stroud with Dexter J. Booth., London : Red Globe Press, 2020.ISBN: 9781352010282
K. A. Stroud, Dexter J Booth, Engineering mathematics / K.A. Stroud with Dexter J. Booth., Industrial Press, 2013.ISBN: 9780831134709
K. A. Stroud author., Dexter J. Booth author., Engineering mathematics / K.A. Stroud and Dexter J. Booth., Basingstoke : Palgrave Macmillan, 2013.ISBN: 9781137031204

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

Available to visiting and exchange students.

PH-024 Waves, Optics and Thermal Physics

Credits: 20 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr EI Zavala Carrasco

Format: Lectures - 22 hours (2 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: Lectures and workshops (problem-solving sessions, experimental labs, computing labs, or skills sessions).

Module Aims: Introduction to wave motion, physical and ray optics, thermodynamics, and kinetic theory.

Module Content: Wave motion
- Wavelength, period, frequency
- Amplitude, energy, phase
- Longitudinal and transverse waves
- Sound and the decibel scale

Reflection and refraction
- Reflection of waves
- Ray diagrams
- Snell's law
- Refractive index and wave speed
- Critical angle and total internal reflection
- Lenses
- Magnification

Interference and diffraction
- Superposition, phase, path difference
- Stationary waves
- Standing waves on a string and in pipes
- Diffraction, resolution
- Interference
- Young's double slit experiment

Thermodynamics
- Internal energy
- Heat and temperature
- Zeroth Law of Thermodynamics
- First Law of Thermodynamics
- Temperature scales
- Measuring temperature
- Specific heat capacity
- Latent heat

Gases and kinetic theory
- Gas pressure and work
- Boyle's Law, Pressure Law, Charles' Law
- Absolute zero
- Avogadro's constant
- Ideal gas law
- Kinetic theory

Intended Learning Outcomes: Demonstrate an understanding of the physical laws describing wave motion, optics, and thermal physics.

Ability to perform calculations and solve problems based on the content of this module. In particular:

- Wave motion
- Reflection and refraction
- Interference and diffraction
- Thermodynamics
- Gases and kinetic theory

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment:	Coursework 1 (3%) Coursework 2 (3%) Coursework 3 (3%) Coursework 4 (3%) Coursework 5 (3%) Coursework 6 (3%) Coursework 7 (3%) Coursework 8 (3%) Coursework 9 (3%) Coursework 10 (3%) Examination (70%)
Resit Assessment:	Examination (Resit instrument) (100%)

Assessment Description: Component descriptions: Workshops and Examination (Workshops will be listed under Coursework 1-10)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit exam component

Reading List: John D. Cutnell, Kenneth W Johnson, Introduction to Physics / John D. Cutnell & Kenneth W. Johnson ; with contributions by Kent D. Fisher., Wiley, 2009.ISBN: 9780470409428
Keith Johnson 1938- author., Simmone Hewett author.; Sue Holt author.; John Miller author., Advanced physics for you / Keith Johnson, Simmone Hewett, Sue Holt, John Miller., Oxford : Oxford University Press, 2015.ISBN: 9781408527375
Shankar, Ramamurti, author., Fundamentals of physics II : electromagnetism, optics, and quantum mechanics, Yale University Press, 2020.ISBN: 9780300243789
Shankar, Ramamurti, author., Fundamentals of physics. 1, Mechanics, relativity, and thermodynamics, Yale University Press, 2019.ISBN: 9780300243772

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

Available to visiting and exchange students.

PH-025 Atoms, Nuclei and Particles

Credits: 20 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Prof N Madsen, Dr SM Shermer

Format: Lectures - 22 hours (2 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: Lectures and workshops (problem-solving sessions, experimental labs, computing labs, or skills sessions).

Module Aims: Introduction to atomic physics, nuclear physics, and particle physics.

Module Content: Electrons and photons
- Thermionic emission
- Electron kinetic energy
- Thomson's experiment
- Millikan's experiment
- Photoelectric effect
- Planck's equation
- Work function
- Wave-particle duality
- de Broglie's equation

Spectra and energy levels
- Electromagnetic spectrum
- Heat radiation
- Black-body radiation and Wien's Law
- Luminosity of stars and Stefan's Law
- Continuous and line spectra
- Energy levels and quanta
- Absorption spectra
- Lasers

Radioactivity
- Alpha particle scattering
- Nuclear model of the atom
- Atomic structure
- Isotopes
- Radioactivity
- Detecting radioactivity
- α, β and γ radiation
- Radioactive decay
- Nuclear stability
- Exponential decay and half-life

Nuclear energy
- Mass defect
- $E=mc^2$
- Binding energy
- Fission
- Fusion
- Nuclear power stations

Particle Physics
- Matter and anti-matter
- Quarks and leptons
- Hadrons
- Conservation laws
- Fundamental forces and particle exchange
- Feynman diagrams

OPTIONAL TOPICS:

Special relativity
- Michelson-Morley experiment
- Time dilation
- Muon decay
- Length contraction
- Relativistic mass

Medical imaging

- X-ray imaging
- Attenuation coefficient
- Radioactive tracers
- Positron emission tomography
- Magnetic resonance imaging

Intended Learning Outcomes: Demonstrate an understanding of the physical laws describing atoms, nuclei, and sub-atomic particles.

Ability to perform calculations and solve problems based on the content of this module. In particular:

- The photoelectric effect
- Atomic energy spectra
- Radioactivity
- Nuclear energy
- Particle physics

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment:	Coursework 1 (3%) Coursework 2 (3%) Coursework 3 (3%) Coursework 4 (3%) Coursework 5 (3%) Coursework 6 (3%) Coursework 7 (3%) Coursework 8 (3%) Coursework 9 (3%) Coursework 10 (3%) Examination (70%)
Resit Assessment:	Examination (Resit instrument) (100%)

Assessment Description: Component descriptions: Workshops and Examination (Workshops will be listed under Coursework 1-10)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit if applicable.

Reading List: Jim Breithaupt author., Physics / Jim Breithaupt., London : Palgrave, 2015.ISBN: 9781137443236
John D. Cutnell, Kenneth W Johnson, Introduction to Physics / John D. Cutnell & Kenneth W. Johnson ; with contributions by Kent D. Fisher., Wiley, 2009.ISBN: 9780470409428
Keith Johnson 1938- author., Simmone Hewett author.; Sue Holt author.; John Miller author., Advanced physics for you / Keith Johnson, Simmone Hewett, Sue Holt, John Miller., Oxford : Oxford University Press, 2015.ISBN: 9781408527375

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

Available to visiting and exchange students.

PH-026 Foundation Mathematics for Physicists II

Credits: 20 Session: 2023/24 January-June

Pre-requisite Modules:

Co-requisite Modules:

Lecturer(s): Dr SG Roberts

Format: Lectures - 22 hours (2 x 1 hour per week); Workshops - 22 hours (1 x 2 hours per week)

Delivery Method: Lectures and workshops (problem-solving sessions, experimental labs, computing labs, or skills sessions).

Module Aims: Mathematics skills to complement the Foundation Year physics curriculum and prepare students for Level 1 physics.

Module Content: 1. Differentiation
2. Integration
3. Complex numbers
 - Polynomials
 - Geometry
 - De Moivre's theorem
4. Matrices
5. 1st order differential equations
6. 2nd order differential equations

Intended Learning Outcomes: Demonstrate an understanding of the fundamental mathematics required for introductory physics studies.

Ability to perform calculations and solve problems based on the content of this module. In particular:

Students will be capable of explaining important terms and concepts, and recalling key formulae, without the aid of text books or other sources.

Assessment:	Coursework 1 (3%) Coursework 2 (3%) Coursework 3 (3%) Coursework 4 (3%) Coursework 5 (3%) Coursework 6 (3%) Coursework 7 (3%) Coursework 8 (3%) Coursework 9 (3%) Coursework 10 (3%) Examination (70%)
Resit Assessment:	Examination (Resit instrument) (100%)

Assessment Description: Component descriptions: Workshops and Examination (Workshops will be listed under Coursework 1-10)

Moderation approach to main assessment: Moderation by sampling of the cohort

Assessment Feedback: Written work marked by the lecturer: work is returned to student with written feedback.
Peer-marked work: students mark each-other's work, according to a marking scheme prepared by the lecturer.
Electronic assessments: work is marked electronically.
Workshops: marks and individual verbal feedback are given during the workshop.
All assessments: students can request more detailed feedback by contact the lecturer, for example during office hours.

Failure Redemption: Re-sit if applicable.

Reading List: K. A. Stroud author., Dexter J. Booth author., Engineering mathematics / K.A. Stroud with Dexter J. Booth., London : Red Globe Press, 2020.ISBN: 9781352010282
K. A. Stroud, Dexter J Booth, Engineering mathematics / K.A. Stroud with Dexter J. Booth., Industrial Press, 2013.ISBN: 9780831134709
K. A. Stroud author., Dexter J. Booth author., Engineering mathematics / K.A. Stroud and Dexter J. Booth., Basingstoke : Palgrave Macmillan, 2013.ISBN: 9781137031204
Jenny Olive 1939-, Maths : a student's survival guide / Jenny Olive., Cambridge University Press, 2003.ISBN: 9780521017077
Tony Croft 1957- author., Robert Davison (Math Professor) author., Foundation maths / Anthony Croft, Robert Davison., Harlow : Pearson Education Limited, 2020.ISBN: 9781292289731
Anthony Croft author., Robert Davison author., Foundation maths / Anthony Croft, Robert Davison., Place of publication not identified : Pearson Education Limited, 2019.ISBN: 1292289686
Tony Croft author., Robert Davison author., Foundation maths / Anthony Croft, Robert Davison., Harlow, England : Pearson Education Ltd, 2016.ISBN: 9781292095172

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

Available to visiting and exchange students.