Swansea University
Prifysgol Abertawe

COLLEGE OF ENGINEERING

UNDERGRADUATE STUDENT HANDBOOK

YEAR 1 (FHEQ LEVEL 4)

AEROSPACE ENGINEERING DEGREE PROGRAMMES

SUBJECT SPECIFIC (PART TWO OF TWO)

MODULE AND COURSE STRUCTURE

2018/19

DISCLAIMER

The College 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 College 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 College directly if you require further information.

The 2018/19 academic year begins on 24 September 2018

DATES OF 2018/19 TERMS

24 September 2018 – 14 December 2018

07 January 2019 – 12 April 2019

6 May 2019 – 14 June 2019

SEMESTER 1

24 September 2018 – 25 January 2019

SEMESTER 2

28 January 2019 – 14 June 2019

WELCOME

We would like to extend a very warm welcome to all students for the 2018/19 academic year and in particular, to those joining the College for the first time.

The University offers an enviable range of facilities and resources to enable you to pursue your chosen course of study whilst enjoying university life. In particular, the College of Engineering offers you an environment where you can develop and extend your knowledge, skills and abilities. The College has excellent facilities, offering extensive laboratory, workshop and IT equipment and support. The staff in the College, many of whom are world experts in their areas of interest, are involved in many exciting projects, often in collaboration with industry. The College has excellent links with industry, with many companies kindly contributing to the College's activities through guest lectures and student projects. We have close links with professional engineering bodies and this ensures that our courses are in tune with current thinking and meet the requirements of graduate employers. All the staff are keen to provide a supportive environment for our students and we hope that you will take full advantage of your opportunities and time at Swansea.

We hope that you will enjoy the next academic session and wish you every success.

Professor Stephen GR Brown
Head of the College of Engineering

Professor Cris Arnold
Deputy Head of College and Director of Learning and Teaching

Professor Johann Sienz
Deputy Head of College and Director of Innovation and Engagement

Professor Perumal Nithiarasu
Deputy Head of College and Acting Director of Research

AEROSPACE ENGINEERING PORTFOLIO DIRECTOR:
Dr Nick Croft (t.n.croft@swansea.ac.uk)
Room A204, Engineering Central

YEAR 1 CO-ORDINATOR:
Dr Alexander Shaw (a.d.shaw@swansea.ac.uk)
Room A115, Engineering Central

ADMINISTRATIVE SUPPORT:
Should you require **administrative support** please visit the Engineering Reception, open Monday – Friday 8:30am – 5:00pm and speak with a member of the Student Information Team who will be happy to help.

IMPORTANT INFORMATION

IMPORTANT – EG-120; EG-166; EG-113 & EG-115

These modules are assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework. The re-sit (supplementary) is 100% exam based.

Year 1 (FHEQ Level 4) 2018/19
Aerospace Engineering

BEng Aerospace Engineering[H400,H405]
BEng Aerospace Engineering with a Year Abroad[H401]
BEng Aerospace Engineering with a Year in Industry[H402]
MEng Aerospace Engineering[H403]
MEng Aerospace Engineering with a Year Abroad[H406]
MEng Aerospace Engineering with a Year in Industry[H404]

Coordinator: Dr AD Shaw

Semester 1 Modules	Semester 2 Modules
EG-113 **Engineering Analysis 1A (Aero & Civil)** **10 Credits** **Dr PD Ledger** **CORE**	**EG-115** **Engineering Analysis 2A (Aero & Civil)** **10 Credits** **Dr I Sazonov** **CORE**
EG-163 **Design and Laboratory Classes 1** **10 Credits** **Dr D Deganello/Dr S Birosca/Dr RJ Lancaster/Dr AC Tappenden**	**EG-120** **Strength of Materials** **10 Credits** **Dr J Clancy/Dr HL Cockings** **CORE**
EG-166 **Engineering Mechanics** **10 Credits** **Dr S Jiffri/Dr Y Xia** **CORE**	**EG-160** **Fluid Mechanics 1** **10 Credits** **Dr M Manolesos/Dr F Del Giudice** **CORE**
EG-180 **Introduction to Materials Engineering** **10 Credits** **Mr MP Coleman**	**EG-161** **Thermodynamics 1** **10 Credits** **Dr D Mcbride/Dr A Coccarelli** **CORE**
EG-194 **Introduction to Aerospace Engineering** **10 Credits** **Dr TN Croft** **CORE**	**EG-165** **Engineering Design 1** **10 Credits** **Dr MJ Clee/Dr PJ Dorrington/Dr AC Tappenden**
EGA119 **Engineering Skills for Aerospace Engineers** **10 Credits** **Dr SP Jeffs/Dr AE Martinez Muniz/Prof MJ Mcnamee/Dr ZA Quiney/...** **CORE**	**EGA118** **Problem solving for Aerospace Engineers** **10 Credits** **Dr TN Croft**
Total 120 Credits	

EG-113 Engineering Analysis 1A (Aero & Civil)

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: This module (in combination with Engineering Analysis 2) provides the essential grounding in mathematical analysis techniques for engineering students. This module ensures that all students have a suitable level of analytical skills for subsequent engineering modules.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures 30 hours
Directed private study 70 hours

Lecturer(s): Dr PD Ledger

Assessment: Coursework 1 (5%)
Coursework 2 (10%)
Coursework 3 (10%)
Coursework 4 (10%)
Examination 1 (65%)

Assessment Description:
Examination:
A closed book 2 hour examination will take place in January (worth 65% of the final mark).

Coursework:
4 electronic online tests with randomised coefficients will be set during the semester. There will be an opportunity to practice similar exercises before attempting each test. These tests make up the coursework element of the course (worth 35% of the final mark). Each test is an individual piece of coursework.

Specific rules for passing this module:
This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

Moderation approach to main assessment: Universal second marking as check or audit

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

Assessment Feedback: A feedback form for the examination will be available electronically.

Feedback will be provided electronically for each of the assessed tests.

Module Content: Module content:

• Linear Algebra: simultaneous equations, Gauss elimination, matrices, rules of matrix algebra, rank and linear dependence, calculation of determinates and eigenvalue problems.

• Number systems: numbers, algebra and geometry.

• Functions: inverse and composite functions, polynomial functions, rational functions, circular functions, exponential, logarithmic and hyperbolic functions, continuous and discontinuous functions.

• Graphing/Plotting of functions.

• Differentiation: basic ideas and definition, elementary functions, rules of differentiation, parametric and implicit differentiation, higher derivatives, optimum values.

• Integration: basic ideas and definition, definite and indefinite integrals, techniques of integration, integrals of partial fractions, integration by parts, integration by substitution.

Intended Learning Outcomes: On successful completion of this unit students will be expected, at threshold level, to be able to:

Demonstrate knowledge of the fundamentals of mathematics, which underpin their engineering degree. (Evaluated in the MyMathLab continuous assessments and the examination, SM2).

Demonstrate a comprehension of the fundamentals of mathematics, which underpin their engineering degree, through the use of the following specific techniques: manipulate algebraic expressions, differentiation (including optmisation of functionals), integration, matrices and Gauss elimination (Evaluated in the examination, SM2).

Reading List:; James, Glyn, Modern engineering mathematics., 2015.ISBN: 1292080736
Croft, Tony,, Davison, Robert., Mathematics for engineers : a modern interactive approach / Anthony Croft, Robert Davison., Pearson,, 2008.ISBN: 9781408263235
Stroud, K. A., Booth, Dexter J., Engineering mathematics / K.A. Stroud ; with additions by Dexter J. Booth., Palgrave Macmillan,, 2007.ISBN: 9781403942463

Additional Notes: AVAILABLE TO visiting and exchange students.

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

This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

EG-115 Engineering Analysis 2A (Aero & Civil)

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: Module Aims: this module (in combination with Engineering Analysis 1) provides further grounding in mathematical analysis techniques for Engineering students. The module extends the understanding into more complex analytical methods, focusing on Taylor series, ordinary differential equations, complex numbers, vector algebra, multi-variable functions, partial differential equations.

Pre-requisite Modules: EG-113

Co-requisite Modules:

Incompatible Modules:

Format: Lectures 20 hours
Tutoring classes 10 hours
Directed private study 70 hours

Lecturer(s): Dr I Sazonov

Assessment: Coursework 1 (5%)
Coursework 2 (10%)
Coursework 3 (10%)
Coursework 4 (10%)
Examination 1 (65%)

Assessment Description: Examination:
A closed book 2 hour examination will take place in May/June (worth 65% of the final mark).

Coursework:
4 electronic online tests with randomised coefficients will be set during the semester. There will be an opportunity to practice similar exercises before attempting each test using homework exercises. These tests make up the coursework element of the course (worth 35% of the final mark). Each test is an individual piece of coursework.

Specific rules for passing this module:
This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

Moderation approach to main assessment: Universal second marking as check or audit

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

Assessment Feedback: A feedback form for the examination will be available electronically.

Feedback will be provided electronically for each of the assessed tests.

Module Content:
• Sequences and series, infinite series, tests of convergence. Taylor series of common functions, approximation of a function by a polynomial

• Ordinary differential equations: classification of differential equations, solutions to first order ODE's including separable,
linear and more specialised types. Solution to second order ODE's with constant coefficients, homogeneous and inhomogeneous. Laplace transform methods.

• Complex numbers: manipulation with complex numbers, Cartesian, polar and exponential forms. Functions of complex variable, Euler's formula, relationship between trigonometric and hyperbolic functions. Solving ODEs with the help of complex numbers.

• Vectors: physical meaning, Cartesian, cylindrical and spherical coordinates scalar and cross products. Equations of lines and planes. Scalar and vector fields.

• Functions of more than one variable: visualisation, partial differentiation, differential operators, finding maximum/minimum of a multi-variable function. Contour, surface and volume integrals.

• Partial differential equation: classifications. First and second order linear PDEs.

Intended Learning Outcomes:

On successful completion of this unit students will be expected, at threshold level, to be able to:

Demonstrate knowledge of the mathematics, which underpin their engineering degree. (Evaluated in the MyMathLab continuous assessments and the examination, SM2).

Demonstrate a comprehension of the mathematics, which underpin their engineering degree, through the use of the following specific techniques: work with complex numbers, manipulate vectors (in Cartesian, cylindrical and spherical coordinates), perform partial differentiation, integrate lines, surfaces and volumes, solve first and second order differential equations and expand real functions into series (Evaluated in the examination, SM2).

Reading List:; James, Glyn, Modern engineering mathematics., 2015.ISBN: 1292080736
Croft, Tony,, Davison, Robert., Mathematics for engineers : a modern interactive approach / Anthony Croft, Robert Davison., Pearson,, 2008.ISBN: 9781408263235
Stroud, K. A., Booth, Dexter J., Engineering mathematics / K.A. Stroud ; with additions by Dexter J. Booth., Palgrave Macmillan,, 2007.ISBN: 9781403942463

Additional Notes: AVAILABLE TO visiting and exchange students.

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

This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

EG-120 Strength of Materials

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: The aim of the module is to gain understanding into how engineering structures and components transmit loads and other external actions by means of internal stresses and how these stresses lead to strains and displacements. The course aims to explain the simple models of beam behaviour, concepts such as Mohr circle of stress and the relationships between stress and strain.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures 2 hours per week
Example classes 1 hour per week
Directed private study 3 hours per week

Lecturer(s): Dr J Clancy, Dr HL Cockings

Assessment: Examination 1 (80%)
Assignment 1 (7%)
Assignment 2 (7%)
Assignment 3 (6%)

Assessment Description: Final examination in May/June will consist of a mix of multiple choice and written solution questions. All questions are compulsory. The examination is closed-book.

Civil/Aerospace/Product Design: Each assignment consists of a Blackboard test.
Medical/Mechanical: Two assignments consists of a Blackboard test. One will be a laboratory experiment

Specific rules for passing this module:
This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: Through 100% supplementary examination in August.

Assessment Feedback: Students receive feedback from each of the three Blackboard tests by being given their scores in each question together with the correct answer. Once the Blackboard test has been scored and the exercises done by the lecturer in an example class, students can re-try the tests as many times as desired. Each time the numeric values of the questions change and they can compare their answers against the correct ones until they are satisfied with their understanding of the topic.
Feedback from the final examination is via the University feedback form.

Module Content:

1 - Introduction to basic concepts: rupture, deformation, stress, strain, brittle and ductile behaviour, elasticity, creep, fatigue, static determinacy. [2]
2 - Basic Beam theory: axial, shear force and bending moments, Euler beam theory, moment of inertia, deflection of beams, indeterminate beams. [8]
3 - Stress and Strain analysis: principal directions, maximum shear stress, Mohr's circle, stress-strain relationships in linear elasticity. Stresses in pressurised vessels. [6]
4 - Advanced beam theory: combined loading, centroid (mass centre) and moment of inertia of general sections, Euler torsion theory, shear stresses, shear warping of sections, shear distribution in rectangular and thin sections. [4]
5 - Revision [2]

Intended Learning Outcomes:

Upon completion of this module students should be able to:
- Determine the compatibility conditions for elementary structures.
- Construct partial and full free body diagrams required to obtain reactions, axial forces, bending moments and shear forces in simple rods and beams.
- Apply the equations of static equilibrium to calculate reactions, axial forces, bending moments, shear forces.
- Construct shear force and bending moment diagrams for beams of varying support conditions.
- Determine beam displacements from bending moments that are compatible with the support conditions.
- Apply the principle of superposition for structures with complex loading.
- Determine the second moment of area of various cross-sections.
- Obtain stress distribution on simple sections from bending moments and shear or axial forces.
- Use the Mohr circle to obtain principal stresses and maximum shear stress in 2-dimensions. Obtain strains from stresses and vice versa for 2-d elastic materials.
- Demonstrate the understanding of origin of formulae that appear in pressure vessel design codes.
- Make basic design and performance calculations on pressure vessels.

Reading List:; Ross, C. T. F.,, Case, John,, Chilver, Henry,, Strength of materials and structures: [print and electronic book] / John Case, Lord Chilver and Carl T. F. Ross., Arnold,, 1999.ISBN: 9780340719206
Hibbeler, R. C., Fan, S. C., Mechanics of materials / R.C. Hibbeler ; SI conversion by S.C. Fan., Prentice Hall,, 2011.ISBN: 9789810685096
Hibbeler, R. C.,, Sekar, K. S. Vijay., Mechanics of materials / R.C. Hibbeler., Pearson Education South Asia Pte Ltd.,, 2013.ISBN: 9789810694364
Gross, D., Mechanics of materials / Dietmar Gross ... [et al.]., Springer,, 2011.ISBN: 9783642128851

Additional Notes: Available to visiting and exchange students.

Failure to complete the Blackboard tests in time will lead to zero marks being awarded in the relevant exercise.

This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

EG-160 Fluid Mechanics 1

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: The module provides an introduction to the methods that can be employed by engineers for the analysis of basic problems involving stationary and flowing fluids.

Pre-requisite Modules:

Co-requisite Modules: EG-113; EG-114; EG-118

Incompatible Modules:

Format: Lectures and examples 33h
Directed private study 44hr
Preparation for assessment 23hr

Lecturer(s): Dr M Manolesos, Dr F Del Giudice

Assessment: Examination (100%)

Assessment Description: Examination. This CLOSED BOOK examination will test understanding of all the material presented in the course. Adhering to the University Examination Guidelines, only University calculators can be used. These will be provided in the exam.

This module is assessed by examination only. Any resits are done by a supplementary exam.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: A supplementary written examination will be set which will form 100% of the mark.

Assessment Feedback:
Electronic feedback on the class examination performance following the relevant Examination Board meetings in June.

Module Content: Basic characteristics of fluids and flows.

Derivation and application of Mass conservation.

Derivation and application of Energy conservation.

Flow in pipes.

Derivation and application of Momentum conservation.

Forces acting on solid surfaces.

Introduction to microscopic balances.

Revision.

Intended Learning Outcomes: By the end of the module, the student should be able to:

Comprehend the conservation laws of mass, energy and momentum.

Apply conservation laws to solve engineering problems.

Determine how to calculate hydrostatic forces on both planar and curved surfaces.

Identify the nature of viscosity and its role in the creation of shear forces.

Distinguish between different flow regimes in pipe flows and solve problems involving friction losses.

Reading List:; Dr. Francesco Del Giudice, Dr. Marinos Manolesos, Fluid Mechanics 1 Notes.
Morton Mace. Denn, Process fluid mechanics / [by] Morton M. Denn., Prentice-Hall, 1980.
Robert L. Mott, Joseph A. Untener author, Applied fluid mechanics : global edition / Robert L. Mott, Joseph A. Untener, Pearson Education Limited, 2015.ISBN: 9781292019611
Yunus A. Çengel, John M Cimbala, Fluid mechanics : fundamentals and applications / Yunus A. Çengel, Department of Mechanical Engineering, University of Nevada, Reno, John M. Cimbala, Department of Mechanical and Nuclear Engineering, the Pennsylvania State University., New York : McGraw Hill, 2014.ISBN: 9780073380322
R. Byron Bird (Robert Byron), 1924-, Warren E. Stewart 1924-; Edwin N. Lightfoot 1925-, Transport phenomena / R. Byron Bird, Warren E. Stewart, Edwin N. Lightfoot., J. Wiley, 2007.ISBN: 9780470115398
M F Webster, EG-160 Fluid Mechanics 1: Lecture Notes, 2014.
Munson, Bruce Roy,, Young, Donald F., Okiishi, Theodore H., Fundamentals of fluid mechanics: SI units / Bruce Munson, Donald F. Young and Theodore H. Okiishi., Wiley,, 2009.ISBN: 9780470398814
Mott, Robert L., Noor, Fatimah Mohd., Aziz, Azmahani Abdul., Applied fluid mechanics / Robert L. Mott; SI conversion by Fatimah Mohd. Noor, Azmahani Abdul Aziz., Pearson Prentice Hall,, 2006.ISBN: 9780131976436
Mott, Robert L, Applied fluid mechanics : global edition / Robert L. Mott., Pearson Education Limited, 2015.ISBN: 1292019611

Additional Notes: Available to visiting and exchange students

Failure to sit the examination will result in a mark of 0% being recorded.

This module is assessed by a single final examination. Any resits are done by a supplementary exam.

The student cohort will be split into two groups. The groups will be clearly defined on the timetable.

The syllabus, Blackboard site and examination for both these groups will be identical.

EG-161 Thermodynamics 1

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: The aim of the module is to give an introduction to the laws of thermodynamics and the relevant properties, thus providing an appreciation of energy conversion processes by covering the following topics: thermodynamic systems, properties of pure substances, liquids, gases and vapours, the first law of thermodynamics, the second law of thermodynamics, closed and open systems and entropy.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures and example classes: 30 hours

Lecturer(s): Dr D Mcbride, Dr A Coccarelli

Assessment: Assignment 1 (5%)
Assignment 2 (5%)
Assignment 3 (5%)
Assignment 4 (5%)
Assignment 5 (5%)
Examination 1 (75%)

Assessment Description: The end of semester exam uses multiple choice questionnaires that are scanned and evaluated using a computer based system. The exam is closed-book with the following supporting documents that are available on blackboard and provided in the exam: data sheet with equations, solution decision flow chart and property tables.

Each assignment consists of a Blackboard test.

The resit examination is one written exam following the same format as the end of semester written exam. The resit examination will form 100% of the module mark.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: A supplementary examination following the same style as the end of semester exam will form 100% of the module mark.

Assessment Feedback: Students receive feedback from each of the five Blackboard tests by being given their scores in each question together with the correct answer and method.

Examination feedback will be available through the forms submitted to the Engineering Community page on Blackboard.

Module Content: The typical syllabus covers [indicative hours]:
- Introduction to the course [0.5]: course requirements in terms of syllabus, attendance, assessment, examples classes, energy and the environment.
- Basic concepts [1.5]: thermodynamics and energy, dimensions and units, closed and open systems, properties of a system, state and equilibrium, processes and cycles, forms of energy, manometer and barometer.
- Energy, Energy Transfer and General Energy Analysis [3]: energy conservation, energy transfer by heat and work, mechanical forms of work, first law of thermodynamics, efficiencies.
- Properties of Pure Substances [4]: pure substance, phases of a pure substance, phase-change processes, property diagrams, property tables, the ideal-gas equation of state, compressibility factor
- Energy Analysis of Closed Systems [4]: specific heats, moving boundary work, internal energy, enthalpy and specific heats of ideal gases, liquids and solids, energy balance for closed systems.
- Energy and Mass Analysis of Control Volumes [5]: conservation of mass, flow work and the energy of a flow fluid, energy analysis for steady-flow devices, steady flow engineering devices, energy analysis for unsteady flow processes.
- Second Law of Thermodynamics [4]: second law of thermodynamics, thermal reservoirs, heat engines, refrigerators and heat pumps,coefficient of performance, reversible and irreversible processes, Carnot principles and cycle, thermodynamic temperature scale, Carnot devices.
- Entropy [4]: entropy, increase of entropy principle, entropy change of substances, isentropic process, entropy diagrams, Tds relations, reversible, steady flow work, minimising compressor work, isentropic efficiencies, entropy balance.
- Revision [2]

Intended Learning Outcomes: Having successfully completed the module, you will be able to demonstrate;

+ Knowledge of basic principles (properties, laws systems) governing thermodynamics (Evaluated in blackboard test and final exam, SM1)

+ Comprehension of the energy conversion processes involving heat and work and energy storage. (Evaluated in blackboard test and final exam, SM1, SM2)

+ Application of thermodynamic principles to solve simple problems involving substances, processes and energy transfer. (Evaluated in blackboard test and final exam SM2, EA1, EA2)

+ Analyse various thermal processes by applying the laws of thermodynamics. (Evaluated in blackboard test and final exam, SM2 SM3, EA1, EA2, EA5, EA6)

+ Use property tables to determine properties of substances. (Evaluated in blackboard test and final exam, SM2, SM3)

Reading List:; CÌ§engel, Yunus A., Boles, Michael A., Thermodynamics : an engineering approach / Yunus A. CÌ§engel and Michael A. Boles ; adapted by Mehmet KanoglÌlu., McGraw-Hill,, 2011.ISBN: 9780071311113
CÌ§engel, Yunus A., Boles, Michael A., CÌ§engel, Yunus A., Property tables booklet to accompany thermodynamics : an engineering approach / Yunus A. CÌ§engel, Michael A. Boles., McGraw-Hill Higher Education,, 2011.ISBN: 9780077359997

Additional Notes: The College of Engineering has a ZERO TOLERANCE penalty policy for late submission of all coursework and continuous assessment.
The course makes use of the blackboard website (bb.swan.ac.uk), which contains an extensive set of examples, past papers, and additional material.

EG-163 Design and Laboratory Classes 1

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: Competence in engineering drawing using an industry standard CAD system and essential laboratory skills

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures 10 hours
Example classes / Laboratory work 20 hours
Directed private study 70 hours

Lecturer(s): Dr D Deganello, Dr S Birosca, Dr RJ Lancaster, Dr AC Tappenden

Assessment: Coursework 1 (14%)
Coursework 2 (36%)
Coursework 3 (25%)
Coursework 4 (10%)
Coursework 5 (15%)

Assessment Description: Coursework 1: CAD assignment
Coursework 2: CAD assembly assignment
Coursework 3: Laboratory report
Coursework 4: Mechanical testing report
Coursework 5: Fluid experiment report

Moderation approach to main assessment: Second marking as sampling or moderation

Failure Redemption: Supplementary coursework based on the CAD elements.

Assessment Feedback: Students will receive pro-forma marking sheets for each assignment.

Module Content: Compulsory a) Engineering drawing skills using a CAD software package to the required British Standard. Drawings: a dimensioning exercise, bike crank assembly.
Option b) (Aerospace, Mechanical, Product Design,Medical) The material selection process via EDU software
Option c) Laboratory (Mechanical, Product Design,Medical): A series of three experiments in Fluids, Thermodynamics and Materials.
Option d) Laboratory (Materials): The assessment of different materials classes; measurement of mechanical properties of a range of materials; interpretation of mechanical tests (tensile and hardness);microscopy of materials.
Option e) Laboratory (Aerospace): A series of three experiments in fluids, flight simulator based training, and measurement and interpretation of mechanical properties of materials.

Intended Learning Outcomes: KU2 Have an appreciation of the wider multidisciplinary engineering context and its underlying principles.
IA1 Apply appropriate quantitative science and engineering tools to the analysis of problems.
PS1 Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control. Evidence of group working and of participation in a major project is expected. However, individual professional bodies may require particular approaches to this requirement.

A knowledge and understanding of effective written and oral communications and standard IT tools.

After completing this module you should be able to:
Produce engineering drawings to the required standard using a CAD system.
Apply basic laboratory techniques including safety issues; data manipulation; development of report writing skills and teamworking

Reading List:; Lombard, Matt C, SolidWorks 2011 parts bible Matt Lombard., Wiley Pub., Inc., 2011.ISBN: 1-118-25775-8

Additional Notes: PENALTY: ZERO TOLERANCE FOR LATE SUBMISSION

EG-165 Engineering Design 1

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: This course follows a series of case studies as given in the course text. This covers a wide range of subjects including conceptual design, innovation, standardisation, reliability, safety, failure, ergonomics, materials and management. Additionally, the students will take part in the compulsory design activity and respective Engineering Application 1 activities.

Pre-requisite Modules:

Co-requisite Modules: EG-163

Incompatible Modules:

Format: Lectures 8 hours
Example classes / Laboratory work 16 hours
Directed private study 76 hours
[including Engineering Applications 1 (EA1) 50 hours]

Lecturer(s): Dr MJ Clee, Dr PJ Dorrington, Dr AC Tappenden

Assessment: Coursework 1 (20%)
Coursework 2 (30%)
Group Work - Project (25%)
Group Work - Practical (25%)

Assessment Description: Car component design and CAD assignment 20%
Basic design assignment (bearing selection, datums, fits & finish) 30%
Design and Build project, relating to EA1 activity 25% each

Moderation approach to main assessment: Second marking as sampling or moderation

Failure Redemption: You would redeem failure by doing a design exercise and submitting a formal report during the normal resit period in summer.

In some cases you may be required to re-submit case study work not previously completed satisfactorily

Assessment Feedback: Lectures will provide feedback on presentations during lecture and laboratory sessions. Tutorial sessions may also be used for general feedback and guidance.

Module Content: 1. Introduction to Design: This course follows a series of case studies as given in the course text. This covers a wide range of subjects including conceptual design, innovation, standardisation, reliability, safety, failure, ergonomics, materials and management. 20 hours nominal study

2. Design Methodology: basic engineering design: bearings, fasteners, limits and fits, tolerances, surface finish. 30 hours nominal study

3. Engineering Applications 1 The EA1 component includes a competitive design and make project and workshop familiarisation via a manufacture to design project. This is a compulsory part of the module and is a residential course (Mechanical, Product Design,): held during term after the summer exam period. Aerospace students are Swansea based for this exercise. This is a compulsory and assessed part of the module. 50 hours nominal study

Intended Learning Outcomes: Intended Learning Outcomes: After completing this module you should have:
A knowledge and understanding of the multidisciplinary nature of design and understand the implications of many design decisions. Understand the main stages of embodiment, concept and detail design and be able to contribute to each of these.

An understanding of the link between design and manufacture of a product prototype model.

An ability to apply analysis tools in the design and manufacture of a product. This will include engineering sciences as well as manufacturing and commercial considerations.

KU2 Have an appreciation of the wider multidisciplinary engineering context and its underlying principles, particularly when applied to design..

D1 Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues.

D4 Use creativity to establish innovative solutions.

D5 Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal

D6 Manage the design process and evaluate outcomes.

P1 Knowledge of characteristics of particular equipment, processes or products

P2 Workshop and laboratory skills

P6 Understanding of appropriate codes of practice and industry standards

P8 Ability to work with technical uncertainty

PS1 Possess practical engineering skills acquired through, work carried out in laboratories and workshops; in individual and group project work; in design work; and in the use of computer software in design, analysis and control

S2 Knowledge of management techniques which may be used to achieve engineering objectives within that context

Reading List:; Dominick, Peter GDemel, John T, Lawbaugh, William M, Freuler, Richard J, Kinzel, Gary L, Fromm, Eli, Tools and tactics of design / Peter G. Dominick ... [et al.]., Wiley, 2001.ISBN: 0471386480
Matthews, Clifford., Case studies in engineering design [print and electronic book] / Clifford Matthews., Arnold,, 1998.ISBN: 0340691352

Additional Notes: PENALTY: ZERO TOLERANCE FOR LATE SUBMISSION

AVAILABLE TO VISITING AND EXCHANGE STUDENTS

EG-166 Engineering Mechanics

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: This module aims to provide the students with the basic knowledge of the fundamental concepts of statics, including force, moment/couple, resultant force and resultant moment of a general force-couple system, equilibrium conditions/equations of a force system, common types of constraints/supports, and free body diagram, and by applying these concepts, the students will be able to solve statically determined truss structures using the methods of joints and sections.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures & Example classes : 3 hours per week
Directed private study: 3 hours per week

Lecturer(s): Dr S Jiffri, Dr Y Xia

Assessment: Examination 1 (80%)
Class Test 1 - Coursework (10%)
Class Test 2 - Coursework (10%)

Assessment Description: 20% from two online tests (10% each) administered via Blackboard at the middle and towards the end of semseter 1, and 80% from 2 hour closed book examination in January.

This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: Closed book exam in the supplementary exam period in August will form 100% of the module mark.

Assessment Feedback: Generic feedback on the online tests will be provided, following the tests. The feedback for the final examination will be through the College module feedback procedure.

Module Content:

Introduction: Basic concepts; Newton's laws of motion; Units; Idealisations of a real body and forces. [1]
2D Force Systems: Force definition; The principle of transmissibility; Concurrent & non-concurrent forces; Resultant forces; Resolution of forces; Projection; Moments and couples; Varignon's theorem; Simplification of co-planar force-couple systems; [6]
Equilibrium: Equations of equilibrium for a rigid body and assemblage of rigid bodies; Types of supports and connections; Free body diagrams; Externally static determinacy; Practical Examples. [5]
Friction: Characteristics of dry friction; Coulomb friction model; The angle of Friction; Wedge; Practical Examples. [5]
Application - Truss analysis: Definitions; Two-force member; Internally static determinacy; The method of joints; The method of sections; Advanced issues. [6]
3D force systems: Forces with vector representation; Moments; Equilibrium of concurrent and general 3D force systems. [5]
Revision [1] and Assessment [1]

Intended Learning Outcomes: After completing the module the student should be able to:

- Calculate the resultant force of several forces using vector analysis; compute the moment of a force generated about a point; and determine both the resultant force and the resultant moment of a general force-couple system;
- Correctly identify types of constraints/supports and corresponding reaction forces;
- Correctly draw free body diagrams;
- Establish and solve the equilibrium equations of a rigid body or a group of rigid bodies subject to various loadings and supports.
- Solve simple problems involving dry friction;
- Determine if a give truss structure is statically determinant or not;
- Apply the method of joints and the method of sections to analyse simple/statically determinant truss structures to obtain the axial forces of all the truss members;
- Determine the resultant force of several 3D forces, and calculate the moment vector of a force produced about a point.

Reading List:; Bedford, Anthony., Fowler, Wallace L., Ahmad, Yusof., Engineering mechanics. Statics / Anthony Bedford, Wallace Fowler ; SI conversion by Yusof Ahmad., Pearson,, 2008.ISBN: 9789810679392
Meriam, J. L., Kraige, L. G., Bolton, J. N.,, Engineering mechanics / J.L. Meriam, L.G. Kraige and J.N. Bolton. Vol. 1, Statics., Wiley,, 2014.ISBN: 9781118807330

Additional Notes: This module is assessed by a combination of examination and coursework. In order for the coursework marks to count, you have to pass the exam component (with at least 40%). If you have less than 40% in the exam, then the module mark will be just the exam mark. Any resits are done by a supplementary exam. If you pass the exam but have failed the coursework, you may still fail the module, depending on the marks achieved, so it is important to do the coursework.

EG-180 Introduction to Materials Engineering

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: The module aims to introduce year 1 Engineering students to the understanding of key concepts relating to materials selection and applications. Following completion of this module the student should be able to demonstrate an appreciation of materials selection in relation to the structure/mechanical and physical properties/applications of metallic, ceramic, polymeric and composite materials.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures: 24 hours
Tutorials / Example classes: 12 hours
Directed private study: 36 hours
Preparation for assessment: 28 hours

Lecturer(s): Mr MP Coleman

Assessment: Exam - Multiple choice questions (100%)

Assessment Description: A 2 hour multiple choice exam in January (100% of the total mark).

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: A 2 hour multiple choice examination in the supplementary exam period in August will form 100% of the module mark.

Assessment Feedback: Feedback on Final Exam in January will be provided via the standard examination feedback form.

Module Content: Principles of Materials Selection: Classes and typical properties of materials, the role of materials selection in mechanical design [1].
Elastic and Plastic Behaviour of Solids: Stress and strain in solids, elastic behaviour. Plastic behaviour, tensile testing, stress-stain curves [3].
Toughness and Hardness Testing: Impact testing, hardness testing [1].
Atomic Structure: Atomic structure, atomic numbers and weights, electronic structure of atoms, types of atomic bonding including ionic, covalent, metallic, intermediate, Van de Waals, and hydrogen bonding [1].
Crystal Structure of Solids: Types of solid state structure (e.g. crystalline and amorphous), atomic packing in crystals, atomic arrangements (eg FCC, HCP, BCC), crystallography: Plane (Miller) indices, direction indices, crystal structure of ceramics [4].
Solidification: Volume change, nucleation and growth of crystals, grain boundaries, glasses: temperature dependence, silica glass structures, forms of silica glass, soda glass [2].
Cement and Concrete: Portland cement and its manufacture, hydration and its development, strength of concrete [1].
Vacancies and Diffusion: Diffusion and Fick's Law, crystal lattice defects, atomic vibration, probability of diffusion, mechanisms of diffusion [2].
Microstructure of Solids: Examples of microstructures, microstructural features, phases, diagrams (maps), unary diagrams and Gibbs Phase rule, solid solubility, solubility in a binary system, composition in a two-phase region, microstructural development, Lever rule [3].
Polymers and Composites: Polymerization, skeletal structures, structure of polymers, homopolymers, copolymers, classification of polymers, classification of composites, manufacture routes, fibre-reinforced composites, fibre matrix interface [2].
Steels: Iron-Iron carbide system, eutectoid steel, effect of carbon content, effect of cooling rate, non-equilibrium steels, heat treatment of steels, diffusion, classification of steels: plain carbon steels (e.g. low-carbon, mild, medium-carbon, high-carbon steels) and alloy steels (e.g. high strength low-alloy steels (HSLA), tool/die steels, corrosion/heat-resistant steels) [4].

Intended Learning Outcomes: The student should be able to demonstrate a knowledge and understanding of:
* The fundamental concepts across a broad spectrum of material families and mechanical/material properties.
* The basic principles of materials selection in mechanical design, including characterisation of mechanical properties, atomic structure of materials, crystal structures, vacancies and diffusion, microstructure evolution (solidification), phase diagrams, the treatment of plain carbon steels, creep, corrosion and oxidation.

Reading List:; Shackelford, James F, Introduction to materials science for engineers / James F. Shackelford, University of California, Davis., 2016.ISBN: 9780273793403
Shackelford, James, Introduction to Materials Science for Engineers, Pearson Education Limited, 2015.ISBN: 9780273793984
Shackelford, James F, Introduction to materials science for engineers / James F. Shackelford., 2014.ISBN: 9780133826654
Callister, William D.; Rethwisch, David G., Materials science and engineering / William D. Callister, Jr., and David G. Rethwisch., 2014.ISBN: 9781118319222
Timings, R. L. (Roger Leslie), Engineering materials. Volume 2 / R.L. Timmings., Longman, 2000.ISBN: 9780582404663
Mercier, Jean-Pierre,, Zambelli, Gerald., Introduction to materials science [electronic resource] / Jean P. Mercier, Gerald Zambelli, Wilfried Kurz., Elsevier,, 2002.ISBN: 9780080950716
Budinski, Kenneth G., Budinski, Michael K., Engineering materials : properties and selection / Kenneth G. Budinski, Michael K. Budinski., Pearson,, 2010.ISBN: 9780136109501
Jacobs, James A.,, Kilduff, Thomas F.,, Engineering materials technology : structures, processing, properties, and selection / James A. Jacobs, Thomas F. Kilduff., Pearson/Prentice Hall,, 2004.ISBN: 9780130481856
Ashby, M. F; Jones, David R. H. (David Rayner Hunkin), Engineering materials. 2 : an introduction to microstructures and processing / Michael F. Ashby and David R.H. Jones., Butterworth-Heinemann, 2013.ISBN: 9780080966687

Additional Notes: PENALTY: THE COLLEGE OF ENGINEERING HAS A ZERO TOLERANCE FOR LATE SUBMISSION OF ALL COURSEWORK AND CONTINUOUS ASSESSMENT
Available to visiting and exchange students.
Full course notes provided. Additional Reading list provided.

EG-194 Introduction to Aerospace Engineering

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: This module will introduce students to the fundamental technology of aerospace engineering. It serves as an integrating module, demonstrating the application of the fundamental scientific principles taught in other modules, in an aerospace context. The module provides a foundation for further specialist aerospace modules at levels 5, 6 and 7.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures 30 hours
Directed private study 70 hours

Lecturer(s): Dr TN Croft

Assessment: Examination 1 (75%)
Assignment 1 (13%)
Assignment 2 (13%)

Assessment Description: The first assignment will require the students to write a two page report, using a prescribed format that is consistent with formal writing, on a topic related to an aircraft design concept. This assignment will require the student to make use of the library and the intranet to obtain the information they will include in the report. This is an individual piece of coursework

The second assignment will test the student's understanding of the mathematics and concepts underlying the topics covered in the course. This is an individual piece of coursework

The examination will be a closed book examination. A data sheet, containing a list of the variables and equations which have been covered in the course, will be provided in the examination. This data sheet will be available to the students, via Blackboard, from the first week of the lectures.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption:
Failure in the module can be redeemed through a combination of the equivalent of the first assignment and the examination.

Students who have failed the module but achieved a pass mark in the first assignment at the first sit will carry that mark forward to the resit and will not be allowed to repeat the assignment. Students who have failed the module but achieved a pass mark in the combined mark of the second assignment and the examination will carry that mark forward to the resit and will not be allowed to repeat the examination.

Assessment Feedback:
Feedback on the first assignment will be available on Blackboard.

Feedback on the second assignment will be through the return of the marked submission. Step by step solutions to the questions will be posted on Blackboard.

Examination feedback will be available through the forms submitted to the Engineering Community page on Blackboard.

Module Content:
- History of aviation. [1] (Not examined)
- The standard atmosphere [1]
- Airfoils, wings and other aircraft components [2]
- Basic principles of flight and aerodynamic characteristics of aircraft. [3]
- Introduction to engine types and characteristics [2]
- Introduction to aircraft performance in flight - climb, range and endurance, loops and turns. [5]
- Introduction to the regulatory system for aircraft and testing [4]
- Materials for aerospace applications [2]

Intended Learning Outcomes:
On successful completion of this module, students should be able, at threshold level, to:

• Collect from a variety of sources information related to an aerospace topic and write a paper that discusses the important aspects of the topic (Evaluated in the assessment 1, G1)
• Identify the equations that can be applied to the solution of problems involving cruise, climb or glide flight and perform calculations to determine flight characteristics such as speed, range, endurance. (Evaluated in assignment 2 and the examination, SM1, SM2, EA1, EA6)
• Demonstrate knowledge and comprehension of the fundamental engineering principles of flight. (Evaluated in the examination, SM1, EA1)

Note: The G1, SM1 et cetera codes relate to accreditation learning outcomes

Reading List:; Anderson, John David., Introduction to flight / John D. Anderson, Jr., McGraw-Hill,, 2012.ISBN: 9780071086059
Fielding, John P.,, Introduction to aircraft design / John P. Fielding., Cambridge University Press,, 1999.ISBN: 9780521657228
Mair, W. Austyn., Birdsall, David L., Aircraft performance / W. Austyn Mair, David L. Birdsall., Cambridge University Press,, 1996.ISBN: 9780521568364
Newman, Dava J., Interactive aerospace engineering and design / Dava J. Newman., McGraw-Hill,, c2002..ISBN: 9780071122559

Additional Notes: Visiting/Exchange students are eligible to enroll on this module.

Blackboard will be used as a repository of all module related documents.

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

EGA118 Problem solving for Aerospace Engineers

Credits: 10 Session: 2018/19 Semester 2 (Jan - Jun Taught)

Module Aims: The module provides an introduction to some of the problem solving techniques that can be used to address the type of problems that are encountered by aerospace engineers. The module will introduce students to the concepts of structured programming and software engineering. It will then use Matlab to allow the students to practice using the techniques.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures / Example classes 20 hours
Laboratory work 10 hours
Directed reading 30 hours
Directed private study 40 hours

Lecturer(s): Dr TN Croft

Assessment: Assignment 1 (10%)
Assignment 2 (10%)
Assignment 3 (10%)
Assignment 4 (20%)
Examination 1 (50%)

Assessment Description: Presentation (Assignment 1): Students will deliver a talk based on the reading material. The presentations will be distributed over the taught portion of the module. Presentations will be on different topics. The creation of the presentation is expected to be a group activity. Delivery of the presentation will be an individual activity. Marks will be awarded to the group for the technical content, and to the presenter for presentation style. Each member of a group will present once during the module.

The remainder of the assessments will be individual activities
Blackboard Test (Assessment 2): A set of Blackboard tests will be used to evaluate the understanding of the concepts. The tests will not be timed beyond having a deadline for submission.
Flight Simulator Exercise (Assessment 3): The students will perform a set of tasks using the flight simulator. This exercise will normally be performed in semester 1.
Matlab Exercise (Assessment 4): The exercise will have two purposes. The first is to test the ability of the students to do some basic tasks in Matlab. The second purpose is to test the ability to write a Matlab program to solve an aerospace problem.
Examination: The exam will be of 1.5 hour duration. The exam will comprise of a set of compulsory questions that will test the students' knowledge, comprehension and ability to apply the subjects covered in the module. Questions in the exam will cover all topics introduced in the module with the exception of the basic space theory.

Moderation approach to main assessment: Universal second marking as check or audit

Failure Redemption: If a student is awarded a re-sit: Failure Redemption of this module will be by repeating an equivalent assignment to any component in which a pass mark was not achieved. Marks achieved in components passed during the first attempt in the current academic year will automatically be transferred to the equivalent component in the resit. No opportunity to resit the passed components will be allowed.

Assessment Feedback: Feedback for the examination will be in a standard format on the College of Engineering Community page on Blackboard. Information provided includes average marks, maximum and minimum marks for the exam as a whole and for individual questions.

Feedback for the Blackboard tests will be through the test themselves.

Feedback for the Matlab exercises will be through worked solutions that are uploaded to Blackboard as well as individual comments.

Module Content: • An introduction to the module and the teaching techniques to be used
• The concepts of problem solving and structured programming
 o An introduction to problem solving
 o Data and variables
 o Logic and loops
 o Structured Programming
 o Pseudo Code
 o Program Design
• Basic space theory
 o Launch equations
 o Orbital equations
• Matlab
 o Basic Matlab commands
 o Matrix manipulation within Matlab
 o Plotting in Matlab
 o Writing a function in Matlab
 o Solving transient problems using Matlab

Intended Learning Outcomes: On successful completion of this module, students should be able, at threshold level, to:

• Explain to their peers what they have learnt related to problem solving (Assessed through assignment 1, G1, G4)
• Demonstrate knowledge and comprehension of what they have learnt related to problem solving (Assessed through assignment 2 and the examination, G1)
• Show knowledge and comprehension of the flying experience (Assessed through assignment 3, P2)
• Use Matlab, pseudo code, flow charts and other techniques taught in this module as part of problem solving. (Assessed
through assignment 4, EA3, D2)

Note: The G1, SM1 et cetera codes relate to accreditation learning outcomes that are partially addressed by the learning outcome

Reading List:; Magrab, Edward B, An engineer's guide to MATLAB : with applications from mechanical, aerospace, electrical, civil, and biological systems engineering / Edward B. Magrab ... [et al.]., Prentice Hall, 2011.ISBN: 0131991108
Moore, Holly, MATLAB for engineers / Holly Moore., 2014.ISBN: 1292060530
Anderson, John D., (John David), Introduction to flight / John D. Anderson, Jr., 2015.ISBN: 9814636185

Additional Notes: • Students will be required to achieve an average score of 70 out of 100 on the assessments, assignments plus examination, to pass this module.
• Available to Visiting and Exchange students.
• Penalty for late submission of work: ZERO TOLERANCE.

EGA119 Engineering Skills for Aerospace Engineers

Credits: 10 Session: 2018/19 Semester 1 (Sep-Jan Taught)

Module Aims: The module will introduce students to a range of professional skills that are part of engineering practice such as group work, ethics, sustainability, health & safety and employability. Technical communication and report writing will also be introduced in the module in the context of the Bloodhound SSC. To allow students to practice these skills a statistical based analysis exercise using Excel will be undertaken. Excel, uncertainty and statistical skills will also be taught as part of the module to support the analysis exercise.

Pre-requisite Modules:

Co-requisite Modules:

Incompatible Modules:

Format: Lectures and seminars 14 hours
Practical work 16 hours
Assessment and private study 70 hours

Lecturer(s): Dr SP Jeffs, Dr AE Martinez Muniz, Prof MJ Mcnamee, Dr ZA Quiney, Dr PA Xavier

Assessment: Coursework 1 (0%)
Coursework 2 (10%)
Coursework 3 (10%)
Coursework 4 (10%)
Coursework 5 (10%)
Coursework 6 (10%)
Coursework 7 (50%)

Assessment Description:
Coursework 1: English Audit (pass/fail)
Coursework 2: Academic Integrity (10%)
Coursework 3: Group Presentation on Ethics (10%)
Coursework 4: Uncertainty Blackboard Test (10%)
Coursework 5: Excel Blackboard Test (10%)
Coursework 6: CV (10%)
Coursework 7: Group Report (50%) - Group Performance Analysis (20%), Bloodhound SSC Technical Report (30%)

Moderation approach to main assessment: Second marking as sampling or moderation

Failure Redemption: Supplementary coursework, which will form 100% of the module mark, will be available for students.

Assessment Feedback: All assignments (submitted electronically via Blackboard) will receive electronic feedback using the Turnitin feedback system. Tutors will provide feedback on presentations during tutorial sessions. Tutorial sessions will also be used for general feedback and guidance related to the module.

Module Content:

• Management principles: team dynamics, project planning, Gantt charts, leadership skills.

• Career planning and professional development: CVs, covering letters, interview techniques, personal development planning.

• Roles and responsibilities of professionals in science and engineering: health and safety, risk assessment, sustainability,
environmental issues.

• Introduction to uncertainty, statistics and Excel: basics of uncertainty, introduction to statistical methods, introduction to
Excel, input and output of data, operations, functions, plotting.

• Ethics in Engineering case studies.

Intended Learning Outcomes: On successful completion of this unit, students should be able, at threshold level, to:

• Describe the wider multidisciplinary engineering context and its underlying principles as well as describe the ethical implications of engineering design and practice (All CWs – G1, P1, EL1, EL6, D6).

• Recognise and discuss the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement (CW3, CW4, CW7 – EL2, P8).

• Select appropriate quantitative science and engineering tools to the analysis of problems (CW4, CW7 – G1).

• Show evidence of practical engineering skills acquired through, for example, work carried out in laboratories & workshops; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control. (CW5, CW6, CW7 – G1, G2, G3, P11).

• Identify management techniques that may be used to achieve engineering objectives within that context (CW7 – EL3, P11, G4).

• Outline the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues (CW2, CW7 – EL5).

Reading List:;

Additional Notes:
PENALTY: ZERO TOLERANCE FOR LATE SUBMISSION; SUBMISSION ON EACH ASSIGNMENT MANDATORY.