PETROC

UNIVERSITY OF PLYMOUTH

# ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2021-22

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# FdSc Electronics & Communication

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Contents:

# Welcome and Introduction

Welcome to the FdSc Electronics and Communications delivered at North Devon Campus by Petroc.

The FdSc Electronics and Communications programme will prepare students to play a leading role in the continuing adventure of modern communications – researching, designing, building and marketing the next generation of products. In addition, students are required to demonstrate a knowledge of organisational behaviour and people management concerns as the programme aims to develop the managers of tomorrow.

The modern advances of electronic communications have had a huge impact upon society opening up a vast range of career opportunities. The telephone, radio, satellite communications, the internet, mobile phones – each new development has revolutionised the way we live and the way we think about our world. New technologies continuously emerge, with 4G mobile phones offering the possibility of real-time high quality video. DSL and broadband wireless systems provide many times the capacity of modems bringing increased amounts of information into our homes. Other examples include advanced wavelength-division multiplexing schemes, promising vast reductions in the cost of long-distance data transmission.

All these developments have been fuelled by advances in communications technology. Constantly emerging new protocols and coding schemes, new ways to represent video, images and speech as data, new means of delivering this information to users via cable, fibre, and increasingly via radio. These developments are, in turn, based on sound engineering principles. The programme will cover these electronic and electrical principles, electronic design systems, communication engineering and micro programmable systems through an applied approach, predominantly in workshop environments, testing new knowledge and theory in practice. Structured input through a 'Developing Graduate Skills' module will support the development of academic research skills and transferable employability skills.

This programme is designed with the support of local engineering companies to address a range of regional skill shortages. Opportunities have been created throughout the programme for students to engage and work on a variety of live projects with these local businesses. The aim being that on graduation students will have the option of full time employment as an Engineering Technician at a Supervisory level.

This programme serves to aspire students to management roles within the workplace following this course, or to have the academic and research skills and ideas to make an effective step to Level 5 of the BSc (Hons) in Electrical and Electronic Engineering at Plymouth University.

This programme has been designed to equip you with the skills and knowledge base required to work in your chosen specialism or other graduate opportunities. It is also a platform from which you can undertake additional vocational and academic qualifications.

This Programme Quality handbook contains important information including:

- The approved programme specification
- Module records

Note: The information in this handbook should be read in conjunction with the current edition of:

- Your University Student Institution Handbook which contains student support based information on issues such as finance and studying at HE available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=3059
- Your Module Guide available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=696
- Your University of Plymouth Student Handbook available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

# Programme Specification

## 1. Programme Details

| | |
|---|---|
| Awarding Institution: | University of Plymouth |
| Partner Institution and delivery site (s): | Petroc |
| Accrediting Body: | N/A |
| Language of Study: | English |
| Mode of Study: | Full-time and Part-time |
| Final Award: | FdSc Electronics and Communications |
| Intermediate Award: | N/A |
| Programme Title: | Electronics & Communications |
| UCAS Code: | HH16 |
| JACS Code: | H610 |
| Benchmarks: | QAA Engineering Subject Benchmark (2015) |
| Date of Programme Approval: | 26th April 2016 |

## 2.1 Programme Delivery

The programme will deliver:

1. Well resourced learning environments to inspire and challenge students to develop the knowledge base needed for a technical career in a range of Electronics and Communications occupations.
2. Expert support to develop students' ability to apply up to date skills to build and test electronic solutions to professional standards.
3. Experienced lecturers to provide an enriched curriculum by incorporating industrial links, electronic practices and research led case studies to develop practical appreciation of theory to practice.
4. Links to the work place to enable students to develop competency in designing, developing and creating analogue, digital and embedded solutions within a work place situation.
5. Personal and professional development to enable students to progress successfully into a wide range of career pathways within electronic communications or to progress within higher education options

## 2.2 Programme Intended Learning Outcomes (ILO)

By the end of this programme the student will be able to:

1. Understand and apply knowledge, concepts and principles relevant to electronic and communications systems.
2. Analyse, critically evaluate and justify selections of the most appropriate methodologies for the interpretation of data.
3. Design, build, test and reflect on a range of hardware solutions using electronic systems (including embedded systems)

4. Communicate effectively verbally, to both technical and non-technical audiences presenting analytical work including routine and non-routine graphical techniques
5. Develop a critical evaluation of their own learning through reflection on their own practice

### 2.3 Progression Route(s)

On successful completion of this Foundation Degree, graduates may progress to:
1. BSc (Hons) Integrated Technologies Engineering at Petroc. This is a final year (level-6) top-up award also delivered at a number of other University of Plymouth's partners.
2. BEng (Hons) Electrical and Electronic Engineering at the University of Plymouth at level-5, which enables joining this pathway to UK Engineering Council Chartered Engineering (CEng) accreditation. A minimum of 60% aggregate from the Foundation Degree is required

The contribution of marks from prior levels of study to the progression award is governed by University regulations.

### 2.4 Admissions Criteria

| Qualification(s) Required for Entry to this Programme: | Details: |
|---|---|
| Level 2:<br>Key Skills requirement / Higher Level Diploma:<br>and/or<br>GCSEs required at Grade C or above: | N/A<br><br>Maths and English Grade C or above |
| Level 3: at least one of the following:<br><br>AS/A Levels<br>Advanced Level Diploma:<br>BTEC National Certificate/Diploma:<br>VDA: AGNVQ, AVCE, AVS:<br>Access to HE or Year 0 provision:<br>International Baccalaureate:<br>Irish / Scottish Highers / Advanced Highers: | 80-96 UCAS points<br><br>Maths, Physics, Design Technology, Engineering<br><br>MMM or DM |
| Work Experience: | Plymouth University Regulations apply |
| Other HE qualifications / non-standard awards or experiences: | Plymouth University Regulations apply |
| APEL / APCL[1] possibilities: | Plymouth University Regulations apply |
| Interview / Portfolio requirements: | ALL applicants are to be interviewed |
| Independent Safeguarding Agency (ISA) / Disclosure and Barring Service (DBS) clearance required: | N/A |

### 2.5 Academic Standards and Quality Enhancement

The Programme Leader/Manager (or other descriptor) leads the Programme Committee in the following of Plymouth University's annual programme monitoring process (APM), as titled at the time of approval. APM culminates in the production, maintenance and employment of a programme level Action Plan, which evidences appropriate management of the programme in

[1] Accredited Prior Experiential Learning and Accredited Prior Certificated Learning

terms of quality and standards. Any formally agreed change to this process will continue to be followed by the Programme Leader/Manager (or other descriptor) and their Programme Committee.

Elements of this process include engaging with stakeholders. For this definitive document it is important to define:

Subject External Examiner(s):

Two External Examiners have been appointed to cover all modules across all level 4 and level 5 programmes.

Additional stakeholders specific to this programme:

Students play a significant role in the quality assurance process of the course in a number of ways. At the end of each module students write a review which is taken to the end of year meetings and considered in the light of staff reflection and experience and improvements are made in the light of this process.

Student reps from each year cohort attend programme committee meetings each semester to feedback their experiences and offer ideas on how to improve. These are recorded in minutes and actioned with feedback provided to the students directly.

Students are also invited to bi-annual meetings with the Senior Management Team and the College Principal to report on progress and how they think the course is progressing. Any concerns highlighted are considered seriously and acted upon where relevant to lead to continued improvement.

Local employers are engaged as lecturers and bring into the classroom their real and current working knowledge and practices, enriching the student experience with live case studies and live projects. Employers visit to share their expertise and knowledge such as those working in the Engineering sector, community development and local businesses. Employers are also involved in developing further understanding by inviting them to Engineering Advisory meeting which occurs once a term, where project and visits are discussed. College staff also attend the North Devon Manufacturers Association where discussion takes place regarding both technical items of interest and educational requirements of the industry.

## 2.6 Programme Structure[2]

The following structure diagram(s) provides the current structure for this programme:

| FHEQ Level: 4 For: Electronics & Communication (Full Time) | | | |
|---|---|---|---|
| F/T Route Year | Core or Option Module | Credits | Module |
| All year | Core | 20 | PETR1031 Developing Graduate Skills |
| 1 Sem 1 (AU) | Core | 20 | PETR1032 Analytical Methods |
| 1 Sem 1 (AU) | Core | 20 | PETR1034 Electrical and Electronic Principles |
| 1 Sem 2 (SP) | Core | 20 | PETR1035 Electronics |
| All year | Core | 20 | PETR1004 Organisational Behaviour |
| 1 Sem 2 (SP) | Core | 20 | PETR1033 Advanced CAD |

| FHEQ Level: 5 For: Electronics & Communication (Full Time) | | | |
|---|---|---|---|
| F/T Route Year | Core or Option Module | Credits | Module |
| 2 Sem 2 (SP) | Core | 20 | PETR2031 Electronic System Design |
| 2 Sem 2 (SP) | Core | 20 | PETR2035 Control Principles |
| 2 All year | Core | 20 | PETR2029 Level 5 Project |
| 2 All Year | Core | 20 | PETR2030 Instrumentation and Control |
| 2 Sem 1 (AU) | Core | 20 | PETR2032 Communication Engineering |
| 2 Sem 1 (AU) | Core | 20 | PETR2033 Micro Programmable Systems |

[2] The provided table includes only a single line. This should be multiplied by copying and pasting to produce the correct number of modules for the level of the programme. For ease of consideration and clarity, please include a separate table for each level by again copying and pasting this table. Colour coding/ shading may be used to differentiate between new modules and existing approved modules shared with other programmes.

| FHEQ Level: 4 For: Electronics and communication (Part time) | | | |
|---|---|---|---|
| P/T Route Year | Core or Option Module | Credits | Module |
| All year | Core | 20 | PETR1031 Developing Graduate Skills |
| 1 Sem 1 (AU) | Core | 20 | PETR1032 Analytical Methods |
| 1 Sem 1 (AU) | Core | 20 | PETR1034 Electrical and Electronic Principles |
| 1 Sem 2 (SP) | Core | 20 | PETR1035 Electronics |
| 2 All year | Core | 20 | PETR1004 Organisational Behaviour |
| 2 Sem 2 (SP) | Core | 20 | PETR1033 Advanced CAD |

| FHEQ Level: 5 For: Electronics and Communication (Part Time) | | | |
|---|---|---|---|
| P/T Route Year | Core or Option Module | Credits | Module |
| 2 Sem 2 (SP) | Core | 20 | PETR2031 Electronic System Design |
| 2 Sem 2 (SP) | Core | 20 | PETR2035 Control Principles |
| 3 All year | Core | 20 | PETR2029 Level 5 Project |
| 3 All Year | Core | 20 | PETR2030 Instrumentation and Control |
| 3 Sem 1 (AU) | Core | 20 | PETR2032 Communication Engineering |
| 3 Sem 1 (AU) | Core | 20 | PETR2033 Micro Programmable Systems |

# Module Records

**SECTION A: DEFINITIVE MODULE RECORD.** *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1004 | MODULE TITLE: | Organisational Behaviour |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: N100 |
|---|---|---|

| PRE-REQUISITES: NONE | CO-REQUISITES: NONE | COMPENSATABLE: YES |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module considers how organisational behaviour and attitude influences the behaviour of individuals and groups at work. The module will use a range of theories and managerial approaches to analyse and explain human behaviour at work.

| ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]* | | | | | |
|---|---|---|---|---|---|
| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
| E1 (Examination) | 0% | C1 (Coursework) | 100 % | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Business, Health and Education

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
The aim of this module is to provide students with an understanding of the theory of how organisations manage employees to achieve a range of managerial objectives. The intention being to consider organisational and employee behaviour from a theoretical perspective.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:

1. Identify and explain the advantages / disadvantages of a range of organisational structures
2. Identify a range of organisational cultures
3. Identify a range of theoretical approaches to human motivation
4. Analyse the significance of group behaviour at work
5. Demonstrate an understanding of a range of management and leadership styles and explain when each might be most appropriate.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | Petroc |
| DATE(S) OF APPROVED CHANGE: | Click here to enter a date. | TERM/SEMESTER: | All Year |

| Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required |
|---|

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must e considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 133 |
|---|---|

| MODULE LEADER: Lee Norburn | OTHER MODULE STAFF: None |
|---|---|

SUMMARY of MODULE CONTENT

- Organisational Aims, Objectives, Policies, Organisational Structure and Development
- Organisational Culture. Systems of Communication
- Managing Change
- The Impact of Technology. Quality (Operations Management)
- Perception , Group Behaviour, Motivation , Leadership
- Business Ethics

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 48 | Teaching and learning will be delivered through a series of interactive sessions that encourage learner participation and engagement in the topics discussed. A scheme of work will be provided in induction week which details the scheduled teaching and learning approach within this module. |
| Self Directed | 152 | Undergraduates will be required to read around the subject using academic books and appropriate journals/texts related to the subject of organisational behaviour, management and leardership. Students will also be expected to research and write the summative assessments for the module which comprise two reports. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E_ | | 0%<br>Total = 100% | |
| | T_ | | %<br>Total = 100% | |
| Coursework | C1 | Report (2500 words)<br>Essay and reflection (2000 words) | 50%<br>50%<br>Total = 100% | LO1, 2 and 3<br>LO4 and 5 |
| Practical | P_ | | %<br>Total = 100% | |

| Updated by: | Date: | Approved by: | Date: |
|---|---|---|---|
| Andrew Peacham | 28/08/2019 | Andrew Peacham | 28/08/2019 |

Recommended Texts and Sources:

Huczynski, A. and Buchanan, D. (2013) *Organizational behaviour* 8th edn. Harlow: Pearson Education

Mullins, L. and Christie, G. (2010) *Management and organisational behaviour*. 9th edn. Harlow: Pearson Education
(Petroc ebook. 8th edition available in hard copy)

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1031 | MODULE TITLE: | Developing Graduate Skills |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: X200 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: No |
|---|---|---|

SHORT MODULE DESCRIPTOR: (max 425 characters)
This module is designed to enable students to demonstrate that they have all the qualities and transferable skills necessary for appropriate academic work and employment requiring the exercise of responsibility and decision making, including the ability to relate their professional practice to underlying theory and principles. Students use reflective techniques to inform and evaluate progress.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 0% | C1 (Coursework) | 100% | P1 (Practical) | 0% |
| E2 (Clinical Examination) | 0% | A1 (Generic Assessment) | 0% | | |
| T1 (Test) | 0% | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To enable students to develop a comprehensive portfolio of evidence that supports their career development and practice.
- To enable students to demonstrate an approach to their practice that is informed by up to date and relevant theoretical perspectives.
- To support students in developing as autonomous learners at HE level.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Understand how relevant theoretical perspectives have informed and enhanced your practical experience and/or knowledge within your subject area.
2. Reflect upon and demonstrate with evidence from own practice the ability to work independently and in a team, using effective communication skills.
3. Reference research accurately and appropriately.
4. Evaluate your weaknesses and strengths in relation to your experiential learning and reflect upon fulfilling your plans to reach your potential role within the work place/organisation.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | All year |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

## SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must e considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 119 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

- Academic literacy and research conventions in their chosen field;
- The requirements of professional practice
- Informed reflection, self-evaluation and personal action planning;
- Relevant ICT competences to support academic and professional practice;
- Information Literacy, including search strategies, identification and critical selection of quality scholarly information.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 20 | |
| Seminar | 35 | These are structured to support deeper understanding of research papers and for example the selection of key points. |
| Guided Independent Study | 145 | Guided study is structured through a series of online tutorials to support research and referencing, and other study skills with lessons and assignment tasks. Other independent study involves portfolio building regarding self-reflection on study skill development and career planning. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E_ | | Total = 0% | |
| | T_ | | Total = 0% | |
| Coursework | C1 | Report 1<br>Report 2 | 60%<br>40%<br>Total = 100% | LO 2,3<br>LO 1,4 |
| Practical | P1_ | | Total =0% | |

| Updated by: | Date: | Approved by: | Date: |
|---|---|---|---|
| Irina Spulber | 09/2021 | Stacey Tanton | 16/05/2020 |

Recommended Texts and Sources: (use most current available edition)

Cottrell, S. (2016) *The Study Skills Handbook*. Palgrave Study Skills

Cottrell, S. (2015) *Skills for Success: Personal Development and Employability*. Palgrave Study Skills

Hind, D. Moss, S. (2015) *Employability Skills*. Business Education Publishers

McMurray, P. (2012), *Study Skills Essentials: Oxford Graduates Reveal Their Study Tactics, Essay Secrets and Exam Advice*

Journals
Harvard Business Review various articles
Websites

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1032 | MODULE TITLE: | Analytical Methods |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: No |
|---|---|---|

SHORT MODULE DESCRIPTOR: (max 425 characters)
This module focuses upon the mathematical strategies and processes involved in solving a wide range of engineering problems. Develops analytical and algebraic skills transferable to engineering subjects. Gives students the analytical tools to solve problems in their own field and also exposes them to the application of complex number, matrix methods, calculus and statistics across engineering.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 40% | C1 (Coursework) | 60% | P1 (Practical) | 0% or Pass/Fail |
| E2 (Clinical Examination) | 0 % | A1 (Generic Assessment) | 0 % | | |
| T1 (Test) | 0 % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS: Students will be able to:
- Develop an appreciation of the need for accurate analysis of engineering problems.
- Improve confidence and competence in the use of numerical and analytical techniques.
- Motivate students to use Mathematics software package for engineering solutions.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Apply routine and non-routine mathematical techniques to solve engineering problems.
2. Determine solutions to engineering problems using differential and integral calculus.
3. Solve first and second order ordinary differential equations.
4. Use matrix algebra and complex number theory in practical applications.
5. Analyse engineering data and evaluate information from various sources.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2019 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 01/2019 | TERM/SEMESTER: | 'SEMESTER 1' (AU) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

## SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE:119 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Combes |
|---|---|

SUMMARY of MODULE CONTENT

- Addition, subtraction, multiplication and division of complex numbers. Polar form and Argand diagram.
- Matrix operators, inverse of a matrix, solution of non-singular linear systems of equations using matrix and determinant methods.
- Definition and interpretation of a derivative. Sum, product, quotient and function of a function rules. Rates of change, second derivative and the use of max/min theory to solve engineering problems. Define the partial derivative, functions of more than two variables, small changes and errors.
- Solve differential equations with general and particular solutions. Linear second order ordinary differential equations with real and complex roots. Complementary function and particular integral. Engineering applications: electrical and mechanical (damped and forced vibrations).
- Integration by parts, the definite integral. Engineering applications of integration e.g.- area, centroid of simple shapes, second moment of area, mean and RMS Mean, SD and variance of bi-variate data. Regression, Pearson's coefficient, Spearman's rank correlation coefficient.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 40 | Guided learning |
| Seminar | 15 | Woking through student issues with set problems |
| Workshop | 20 | Computer based practical application work with support and feedback from tutor. |
| Guided Independent Study | 125 | Guidelines for this are provided on the Moodle and flip teaching activities, preparing for each lesson, is expected. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Formal exam | Total =100% | LO1, LO3 |
| | T1 | | | |
| Coursework | C1 | computer assisted activities to solve problems | Total =100% | LO2, LO4 and LO5 |
| Practical | P_ | | 0% | |

| Updated by:Irina Spulber | Date: 09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use these or more recent editions)

Bird, J. (2014) Higher Engineering Mathematics. 6th edn. Amsterdam: Newnes

Breach, M. (2011) Fundamental Maths for Engineering and Science. Basingstoke: Palgrave Macmillan

Singh, K. (2011) Engineering Mathematics through Applications. 2nd edn. Basingstoke: Palgrave Macmillan

Stroud, K.A. Booth, D. J. (2013) Engineering Mathematics. 7th edn. Palgrave Macmillan

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1033 | MODULE TITLE: | Advanced CAD Techniques |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: H130 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module develops both 2D and 3D modelling skills and the use of computer simulation in support of engineering tasks. The principal activity will be developing a portfolio of engineering drawings and designs by working through graded tasks. Students' produce working drawings and designs, where some are used produce animations and analysis.

| ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]* | | | | | |
|---|---|---|---|---|---|
| WRITTEN EXAMINATION | COURSEWORK | | PRACTICAL | | |
| E1 (Examination) | 0% | C1 (Coursework) | 100% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- Evaluate the differences between 2D drawing, wire-frame, surface and solid modelling techniques and their relationship to the manufacturing process
- To develop the skills necessary to produce models in the development of a design brief
- To develop the skills necessary to produce visualisations
- To investigate the use of simulation software

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Understand and apply 2D techniques and standards to engineering problems and self-reflect upon the result.
2. Produce 3D wire-frame, surface and solid models to an acceptable industry standard and justify techniques used.
3. Apply advanced parametric modelling techniques in the creation of engineering designs including animated visualisations and evaluate own practice.
4. Analyse the performance of systems through simulation software application techniques.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 2' (SP) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 120 |
|---|---|

| MODULE LEADER: Andy Wilson-Rudd | OTHER MODULE STAFF: None |
|---|---|

SUMMARY of MODULE CONTENT

- 3D drawing and editing commands
- Sketching and constraining parameters
- Creating assemblies
- Creating 2D drawings from 3D models
- 3D animations
- Use of design software for simulation purposes
- Use of design software to produce design performance information.
- Direct conversion of 3D models to CAM programs

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 5 | |
| Seminar | 10 | |
| Guided Independent Study | 150 | Carrying out investigations, assessment of documentation and collecting data for CAD |
| Practical Classes & workshops | 35 | Computer based practical application work with support and feedback from tutor. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E | | Total = 0% | |
| | T | | Total = 0% | |
| Coursework | C1 | Portfolio | 100% Total = 100% | LO1 - LO4 |
| Practical | P | | Total = 0% | |

| Updated by: I. Spulber | Date:09/2021 | Approved by: Stacey Tanton | Date:16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (use most current available edition)

Kurowski, P. (2015) *Engineering Analysis with SOLIDWORKS Simulation*.

Planchard, D. (2015) *SOLIDWORKS* 2016 Reference Guide.

Journals

Journals and magazines related to mechanical design: The Engineering; The Engineering Designer; Professional Engineering; Engineering and Technology; Eureka; Develop 3D

Web-based sources

| | |
|---|---|
| Design Council: | http://www.designcouncil.org.uk/ |
| Design Museum: | http://www.designmuseum.org/ |
| eFunda – online reference for engineers: | http://www.efunda.com |
| The Institution of Mechanical Engineers, IMechE: | http://www.imeche.org |
| The Institution of Engineering Designers: | http://www.ied.org.uk/ |
| Patents: | |

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1034 | MODULE TITLE: | Electrical and Electronic Principles |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: No |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides an introduction to electrical and electronic engineering including the key underlying theorems and concepts associated with circuits and components. Developing the both direct and alternating current analysis to form a basis for further studies. Basic level of complex analysis and waveforms is also explored.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 50% | C1 (Coursework) | 50% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- To develop a good fundamental understanding of electrical and electronic principles.
- To provide and understanding of simple and complex waveforms.
- To analyse complex quantities and design methods.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Analyse single phase circuits and derive responses to driving functions.
2. Analyse complex multi-mesh networks.
3. Analyse tuned, coupled circuits and carry out performance calculations to be able to draw valid conclusions.
4. Solve circuit problems involving complex waves.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 1' (AU) |

Additional notes (for office use only):

## SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must e considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 199 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

- Review passive components and basic theorems applied to d.c. networks and transients.
- Calculate equivalent impedance and admittance of a.c. circuits in both rectangular and polar form.
- Apply sinusoidal voltage and current driving functions in both rectangular and polar form to a.c. circuits and derive appropriate responses.
- Maximum power transfer for complex source and load.
- Mesh and nodal equations for complex multi-mesh networks.
- Solution of network problems.
- Mutual inductance, dot notation, secondary impedance, equivalent circuits, resonance.
- Q-factor, bandwidth, selectivity and resonant frequency, universal equation and curves for tuned circuits, mutually-coupled tuned circuits.
- Instantaneous value of a voltage for a complex wave, selective resonance, rms. value of a complex waveform.
- Analyse complex waves, Fourier coefficients.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 15 | Guided Learning and teaching |
| Seminar | 10 | Solving student centred problems |
| Guided Independent Study | 140 | Online worksheets and learning materials |
| Practical Classes & workshops | 35 | Support and feedback from tutor. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Examination | 100%<br>Total = 100% | LO1,3 To test application of given principles |
| | T | | Total = 0% | |
| Coursework | C1 | Report | 100%<br>Total = 100% | LO2,4 practical application of given scenarios |
| Practical | P | | Total = 0% | |

| Updated by: I. Spulber | Date: 09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use most these or more recent editions)

Bird, J.O. (2015) Electrical and Electronic Principles and Technology. Butterworth-Heinemann Ltd

Hughes, E. et al (2016) Electrical & Electronic technology. Pearson

Bird, J.O. (1998) Higher Electrical Technology. Butterworth-Heinemann Ltd

Journals

All journals related to the electrical and electronic Industry, such as:

Everyday Practical Electronics
Electronic Design
New Electronics

Web-based Sources
http://www.electronicsweekly.com/

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR1035 | MODULE TITLE: | Electronics |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 4 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: No |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides an introduction to fundamental electronic theory considering a range of analogue and digital circuits and components so that students will have a firm base from which to work when they undertake further studies.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 50% | C1 (Coursework) | 50% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To develop a good fundamental understanding of analogue and digital electronic principles.
- To build on this knowledge by carrying out analysis of electronic circuits and devices.
- To mathematically model electronic circuits and investigate their performance.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:

1. Explain and test the principles of the common electronic devices and their use in electronic circuits
2. Analyse analogue and digital electronic circuits and determine their performance.
3. Investigate single and multi-stage circuits and carry out performance calculations to draw meaningful conclusions.
4. Evaluate analogue and digital electronic circuits to meet a technical specification

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 2' SP) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 120 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

1. Assess the function and performance of different types of electronic circuit devices.
2. Predict the performance of a selection of circuits using modelling
3. Use simulation packages to provide support for determining circuit performance.
4. Investigate internal structure implemented in common integrated circuits.
5. Determine the effects of feedback in analogue circuits
6. Appraise common digital devices in fundamental combinational and sequential circuits
7. Test, fault finding and evaluate, analogue and digital electronic circuits, modified to meet given specifications.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 10 | Guided Learning and teaching |
| Seminar | 10 | Solving student centred problems |
| Guided Independent Study | 140 | Online worksheets and learning materials |
| Practical Classes & workshops | 40 | Support and feedback from tutor. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Exam | 100%<br>Total = 100% | LO2, LO3 |
| | T | | Total = 0% | |
| Coursework | C1 | Ac and dc analysis report | 100%<br>Total = 100% | LO1, LO4 |
| Practical | P | | Total =0% | |

| Updated by: I.Spulber | Date: 09/21 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use these or more recent editions)

Bird, J. (2013) *Electrical circuits and technology* Butterworth-Heinemann Ltd.

Brown, M. and Rawtani, P.D. (2004) *Practical Troubleshooting of Electrical Equipment and Control Circuits*. Oxford: Newnes eBook

Horwitz, P. and Hill, W. (2015) *The Art of Electronics*. 3rd ed. Cambridge University press

Manchini, R. et el. (2013) *Operational Amplifiers for Everyone*. Texas Instruments

Torrel, D. (2003) *Electronic Troubleshooting*. New York: McGraw Hill

Journals

All journals related to the electrical and electronic Industry, such as:

*Electronic Design*
*Everyday Practical Electronics*
*New Electronics*

Web-based Sources

http://www.electronicsweekly.com/

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: PETR2029 | MODULE TITLE: Level 5 Project |
|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: (max 425 characters)
This module is an individual investigation of a specific problem in any of the engineering disciplines encountered in the programme. It represents a significant amount of work in which the student is proactive in managing their own learning and other resources needed to find a solution to the task which will normally relate to the student's place of work

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 0% | C1 (Coursework) | 80% | P1 (Practical) | 20% |
| E2 (Clinical Examination) | 0 % | A1 (Generic Assessment) | 0 % | | |
| T1 (Test) | 0 % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- To develop an understanding of the inter-relationships between various engineering disciplines.
- To develop an ability to integrate engineering topics within the context of a specific project task.
- To broaden experience and develop a sense of responsibility and self-reliance.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Design a solution to a problem to be solved, or task to be performed and specify the framework within which the work will be carried out.
2. Evaluate a programme for solving the problem or performing the task within the available time.
3. Test the product or solution and reflect upon the process and outcome.
4. Evaluate the information or data and assess whether the project objectives were achieved and what further work may be required.
5. Present findings to an audience to communicate verbally clearly and effectively the project undertaken.

| DATE OF APPROVAL: 09/2016 | FACULTY/OFFICE: Academic Partnerships |
|---|---|
| DATE OF IMPLEMENTATION: 09/2016 | SCHOOL/PARTNER: PETROC |
| DATE(S) OF APPROVED CHANGE: | TERM/SEMESTER: 'All Year' |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 120 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

- Identify possible project aims, objectives and outcomes and produce a proposal.
- Presentation to a relevant audience.
- Prepare a project analysis, to include a planning chart, target dates and sources of information.
- Prepare and manage an industrial visit by the project supervisor.
- Produce an interim report detailing progress to date.
- Make an oral Produce a final report, to include technical and self-evaluations.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 10 | |
| Group work | 25 | Practical experience of project management processes. |
| Guided Independent Study | 140 | Worksheets and online learning material |
| Practical Classes & workshops/labs | 25 | Students can work towards own project outcomes with tutor support – to include one-to-one tutorials to help support progress and personal development in this area. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1_ | | Total =0% | |
| | T_ | | Total = 0% | |
| Coursework | C1 | Report 1 | 100%<br>Total = 100% | LO1,2,3 |
| Practical | P1 | Presentation | 100%<br>Total = 100% | LO4,5 |

| Updated by: Irina Spulber | Date:09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Use these or more recent editions)

Cross, N. (2008) *Engineering Design Method*. 4rd ed. Chichester: Wiley

Lidwell, et Al. (2010). *Universal Principles of Design*. Revised ed. Singapore: Rockport

Weaver. P. (2004) "*Success in Your Project, 1st Edition*". Pearson Education Limited ISBN 0-273678094

Further Resources:
*Project Handbook* (update for 2016 – 2017)

Websites:
Petroc Moodle https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=692

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: PETR2030 | MODULE TITLE: Instrumentation and Control |
|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: (max 425 characters)
This module introduces electrical and mechanical engineering students to basic instrumentation in terms of measuring system approach. Develops knowledge understanding sensor technologies in the application and determining the calibration requirements. Solve problems using modern control systems approach. Appreciate the major developments in digital technologies that impact on instrumentation and control.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 50 % | C1 (Coursework) | 50% | P1 (Practical) | 0% or Pass/Fail |
| E2 (Clinical Examination) | 0 % | A1 (Generic Assessment) | 0 % | | |
| T1 (Test) | 0 % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- Introduce instrumentation technology and practices
- Select modern sensors for engineering control systems
- Develop engineering solutions using modern control systems approach
- Integration of digital systems in instrumentation and control systems

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Understand and apply the basic concepts of instrumentation technology and the use of sensor systems for measured data extraction.
2. Apply suitable instrumentation to meet the requirements of a system specification.
3. Explain control system design fundamentals.
4. Evaluate the operation and performance of control systems.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'All Year' |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 120 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

- Instrumentation principles.
- Transducers using resistance, inductance, capacitive changes to measure force, displacement, strain, pressure, velocity, acceleration, flow, temperature, light intensity.
- Transformer, piezo electric, semiconductor, digital devices.
- Operational and power amplifiers.
- System dynamics and modelling.
- Transfer function and block diagram representation.
- Feedback systems.
- Transient behaviour of systems.
- Laplace transform.
- Stability analysis.
- Applications of embedded solutions to instrumentation and control systems.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 20 | |
| Seminar | 20 | Student led sessions to reflect in peer groups on outcome and results of practical exercises. |
| Guided Independent Study | 140 | Worksheet and online |
| Practical Classes & workshops | 20 | Practical application of theory sessions. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Petr1034* | *Co to l* |
|---|---|---|---|---|---|
| Written exam | E1_ | Examination | 100%<br>Total = 100% | | Exa |
| | T_ | | Total =0% | | |
| Coursework | C1 | Report | 100%<br>Total = 100% | | Rep |
| Practical | P_ | | Total =0% | | |

| Updated by:<br>Irina Spulber | Date:<br>09/2021 | Approved by:<br>Stacey Tanton | Date:<br>16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources:

(Please use these or more recent editions)

Bolton, W. (2015) *Instrumentation and Control Systems*. 2nd edn. Newnes

Dunn, W. (2005) *Fundamentals of Industrial Instrumentation and Process Control*. McGraw-Hill

Websites

Petroc Moodle https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=696

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR2031 | MODULE TITLE: | Electronic System Design |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module builds on the principles of electronics and develops standard circuit and components into more complex systems. A wide range of both analogue and digital systems will be designed, built and tested to specification. The key design and performance

| ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]* | | | | | |
|---|---|---|---|---|---|
| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
| E1 (Examination) | 50% | C1 (Coursework) | 50% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To develop a fundamental understanding of a range of electronic systems and their building blocks.
To provide a sound base for the analysis and design of electronic systems

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Apply appropriate devices for specified functions and analyse outcome.
2. Assess the implications of noise and hazard events in electronic systems.
3. Evaluate the internal requirements of multi-stage electronic circuits
4. Implement the design cycle in the solution to electronic systems design and draw valid conclusions.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 2' (SP) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

## SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 119 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

| SUMMARY of MODULE CONTENT |
|---|
| Discrete semi-conductor devices and components, transducers, integrated circuits.<br>Technical specifications, cost, availability, second source information.<br>Describe the types and sources of noise, effects of noise, sources of interference and methods of suppression.<br>Interfacing techniques in analogue and digital circuits.<br>Multi-stage electronic systems, test specifications, test nodes.<br>Inter-stage and instrument-loading effects.<br>The effect of impairment on the transmission of a pulse or train of pulses.<br>Design systems to meet a technical specification.<br>Test a design, evaluate the results against design criteria, and modify the design as necessary. |

| SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]* | | |
|---|---|---|
| Scheduled Activities | Hours | Comments/Additional Information |
| Lectures | 20 | |
| Seminar | 10 | Students' reflection and evaluation of testing exercises with peer groups. |
| Guided Independent Study | 140 | Online worksheets and activities. Investigations into applications of devices and systems. |
| Practical Classes & workshops | 30 | Design & testing exercises |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Formal examination | 100%<br>Total = 100% | LO2 and LO3 Formal examination short and long questions |
| | T | | Total = 0% | |
| Coursework | C1 | Essay | 100%<br>Total = 100% | LO1 and LO4 Assignment – Analogue and Digital systems. A descriptive essay and analytical assessment of two systems. |
| Practical | P | | Total =0% | |

| Updated by: Irina Spulber | Date:09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use these or more recent editions)

Horowitz, P. and Hill, W. (2015) *The Art of Electronics*. 3rd edn, Cambridge University Press

Storey N, (2013) *Electronics: A Systems Approach.* 5th edn. Pearson

Journals

*Electronic Engineering*
*Electronic Design*
*New Electronics*

Websites

Petroc Moodle https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=696
http://www.electronicsweekly.com/

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: PETR2032 | MODULE TITLE: Communication Engineering |
|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H640 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: (max 425 characters)
A study of commonplace systems to uncover the underlying design philosophy and performance characteristics. To further investigate the underlying principles related to modern electronic communications by applying knowledge of communication theory to current systems.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 40% | C1 (Coursework) | 60% | P1 (Practical) | 0% or Pass/Fail |
| E2 (Clinical Examination) | 0 % | A1 (Generic Assessment) | 0 % | | |
| T1 (Test) | 0 % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- Introduce the fundamentals of analogue and digital communications
- Develop knowledge of modulation and propagation principles
- Analyse and evaluate modern electronic communication systems

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Explain the concept of information and its communication between centres.
2. Investigate and evaluate the fundamentals underlying signal transmission.
3. Analyse communication systems in terms of signal manipulation for analogue and digital systems.
4. Evaluate systems drawn from a range of commonplace communication engineering.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 1' (AU) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 119 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY of MODULE CONTENT

- Concepts of information and communication information transfer. Basic representations of signals and noise. Time and frequency domain models of simple signals. Source signal description as a baseband.
- Fundamentals of propagation: radiation, polarisation and Free Space Loss (in the far field), the basic properties of transmission media.
- Introduction principles of modulation and demodulation in terms of AM and FM.
- Using amplitude and frequency translation and basic carrier modulation for analogue and digital signals. Investigate the mixer as a component. Apply two port network analysis to simple filters.
- Signal manipulation in analogue and digital systems
- Use of analytical techniques to explain their characteristics.
- Study a range of commonplace communication engineering e.g. Broadcast radio, Television (DVB/DBS), Digital Audio, Sonar, GPS, LAN, WiFi.
- Identify communication system characteristics and specifications for typical applications.

| SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]* | | |
|---|---|---|
| Scheduled Activities | Hours | Comments/Additional Information |
| Lectures | 30 | |
| Seminar | 10 | Student sharing of research and outcome of practical workshop sessions to aid deeper understanding and learning. |
| Guided Independent Study | 140 | Online worksheets and learning activities. Guided research into communication systems. |
| Practical Classes & workshops | 20 | Investigations into communication principles |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1_ | Examination | 100%<br>Total = 100% | LO2, 3 short and long questions |
| | T_ | | Total = 0% | |
| Coursework | C1 | Report | 100%<br>Total = 100% | LO1, LO4 |
| Practical | P_ | | Total = 0% | |

| Updated by: Irina Spulber | Date:09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use these or more recent editions)

Irish, R. and Weiss, P. (2013) Engineering Communication: From Principles to Practice. 2nd ed. Oxford University Press Canada

Knisely, C. and Knisely K, 2014, Engineering Communication. International ed. Cengage learning

Journals

Journal of Communication Engineering
IET Digital Library: Electronics & Communication Engineering Journal

Websites

Petroc Moodle https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=696

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: PETR2033 | MODULE TITLE: Micro Programmable Systems |
|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H600 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides an implementation from micro programmable system theory to application relating hardware and software programming to engineer working systems. Students will have a good base from which to work when they undertake further study.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 50% | C1 (Coursework) | 50% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- To develop a good appreciation of the capabilities of Micro Programmable devices in systems.
- To develop a system and run software to meet a technical specification.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Explain the major features of microprocessors and other programmable devices
2. Compare the major features and impact of programmable systems.
3. Develop programs for engineered applications.
4. Evaluate the operation of micro programmable system as part of a project development.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2016 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 06/2016 | TERM/SEMESTER: | 'SEMESTER 1' (AU) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

## SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must e considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 119 |
|---|---|

| MODULE LEADER: Robert Coombes | OTHER MODULE STAFF: Irina Spulber |
|---|---|

SUMMARY of MODULE CONTENT

This module will cover:

- major features of programmable system devices and the associated support requirements.
- capabilities of programmable systems
- system block and schematic diagrams for given problems.
- current developments in microprocessor and programmable technologies.
- application of programmable devices to larger systems development.
- integrated development environment for software development and device programming.
- programmable device in an engineered situation.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 20 | Directed learning activities covering the fundamentals of IDEs and device programming |
| Seminar | 10 | |
| Guided Independent Study | 145 | Online worksheets and activities. Developing applications of micro devices and systems. |
| Practical Classes & workshops | 25 | Design & testing exercises |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Formal examination | 100% Total = 100% | LO1 and LO2 short and long questions |
| | T | | Total = 0% | |
| Coursework | C1 | Assignment | 100% Total = 100% | LO3 and LO4 Design, build and test a system to a specification |
| Practical | P | | Total = 0% | |

| Updated by: Irina Spulber | Date: 09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources: (Please use these or more recent editions)

Horowitz, P. and Hill. W, (2015) *The Art of Electronics.* 3rd edn. Cambridge University Press

Storey N, (2013) *Electronics: A Systems Approach*. 5th edn. Pearson

Zeidman, B. (2002) *Designing with FPGAs and CPLDs*. [online]: Taylor and Francis.

Journals

*Electronic Design*
*New Electronics*

Websites
http://www.st.com/content/st_com/en/products/microcontrollers.html
http://www.microchip.com/design-centers/16-bit
http://www.electronicsweekly.com/
Petroc Moodle https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=696

SECTION A: DEFINITIVE MODULE RECORD. *Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

| MODULE CODE: | PETR2035 | MODULE TITLE: | Control Principles |
|---|---|---|---|

| CREDITS: 20 | FHEQ Level: 5 | JACS CODE: H660 |
|---|---|---|

| PRE-REQUISITES: None | CO-REQUISITES: None | COMPENSATABLE: Yes |
|---|---|---|

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module applies the principles of electrical and electronic theory to the analysis and design of control systems. Develop analytical skills to solve analogue control systems and introduce the background to digital control system design and implementation. Networks and systems will be investigated.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

| WRITTEN EXAMINATION | | COURSEWORK | | PRACTICAL | |
|---|---|---|---|---|---|
| E1 (Examination) | 50% | C1 (Coursework) | 50% | P1 (Practical) | % or Pass/Fail |
| E2 (Clinical Examination) | % | A1 (Generic Assessment) | % | | |
| T1 (Test) | % | | | | |

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
- To develop a good understanding of modern control systems.
- To provide a sound base for analysis and design.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Analyse analogue and digital control systems and discuss the outcomes.
2. Identify the stability of a linear system.
3. Construct system models using transfer functions and controllers and evaluate outcome.
4. Apply two port network theory to solve practical problems and draw valid conclusions.

| DATE OF APPROVAL: | 04/2016 | FACULTY/OFFICE: | Academic Partnerships |
|---|---|---|---|
| DATE OF IMPLEMENTATION: | 09/2019 | SCHOOL/PARTNER: | PETROC |
| DATE(S) OF APPROVED CHANGE: | 01/2019 | TERM/SEMESTER: | 'SEMESTER 2' (SP) |

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

*Items in this section must e considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.*

| ACADEMIC YEAR: 2021/22 | NATIONAL COST CENTRE: 119 |
|---|---|

| MODULE LEADER: Irina Spulber | OTHER MODULE STAFF: Robert Coombes |
|---|---|

SUMMARY OF MODULE CONTENT

- Solve problems relating to systems using analogue control.
- First and second order system modelling.
- Block diagrams representation and manipulation.
- Response to step-input functions.
- System class and steady state errors.
- Dynamic response performance measurements.
- Under, critically and over damped solutions.
- Comparison of open-loop and closed-loop systems.
- System frequency response, Bode and Nyquist diagrams.
- System-stability assessment.
- Root-locus method.
- Laplace transform.
- Z-transform and sampled-data systems, selection of sample rate, estimation of frequency and transient response using the Z-plane.
- Symmetrical two-port network models of active and passive networks, insertion loss.
- Design of symmetrical prototype passive filters.
- Use Z, Y, S or ABCD parameters to solve two port network problems.
- Output of passive networks, attenuator pads using an asymmetric two port model.
- Program digital attenuators and filters to a given specification.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

| Scheduled Activities | Hours | Comments/Additional Information |
|---|---|---|
| Lectures | 20 | Develop modelling and design skills through case studies |
| Seminar | 15 | Elaborate on case studies and worksheets |
| Guided Independent Study | 140 | Online worksheets and activities. Investigations into applications of control in systems. |
| Practical Classes & workshops | 25 | Time for tutor supported practical aspects of the course(problem solving scenarios based on theory covered.) bridging independent study and theory sessions. |
| Total | 200 | (NB: 1 credit = 10 hours or learning; 10 credits = 100 hours) |

| *Category* | *Element* | *Component Name* | *Component Weighting* | *Comments include links to learning objectives* |
|---|---|---|---|---|
| Written exam | E1 | Exam | Total = 100% | LO1,2 Mixture of long and short questions. |
| | T | | Total = 0% | |
| Coursework | C1 | Report | Total = 100% | LO3,4 Practical testing and design. |
| Practical | P | | Total = 0% | |

| Updated by: Irina Spulber | Date: 09/2021 | Approved by: Stacey Tanton | Date: 16/05/2020 |
|---|---|---|---|

Recommended Texts and Sources:(Please use these or more recent editions)

Bolton, W. (2015) *Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering*. 6th ed. Pearson Education

Bolton, W. (2002) *Control Engineering*. 2nd ed. Longman/Pearson Education

Additional reading

Dorf, R. and Bishop, R. (2016) *Modern Control Systems*. (13th Edition), Prentice Hall

Journals

*International Journal of Engineering Education; Control Engineering*