INTERNATIONAL COLLEGE

ROBERT GORDON UNIVERSITY ABERDEEN

PROGRAMME SPECIFICATION

ENGINEERING **SCQF 7**

First Year Degree in Engineering

Version	Current Version	1.18	November 2018
	Prior Version/s	1.09 DRAFT	November 2009
		1.10 DRAFT	January 2010
		2.10 DRAFT	December 2010

		1.11 DRAFT 1.11 (2) (2) & (2) (4) 2.11 1.15 1.16 1.17	May 2011 August 2011 September 2011 September 2015 August 2016 December 2017

PATHWAY/s

Pathway Type	**Undergraduate**			
Pathway Areas	**Engineering**			
Pathways/s	Engineering	-	-	-
University SITS Code/s		-	-	-
College MAZE Code/s	UGEN	-	-	-
Pathway Provision	College: SCQF Level/s	7		
	University: SCQF Level/s	8, 9 and 10		
Awarding University	Robert Gordon University			
Awards by Pathway	Degree awards			SCQF Award Level
	BEng(Hons) Electronic and Electrical Engineering			10
	BEng(Hons) Mechanical and Electrical Engineering			10
	BEng(Hons) Mechanical Engineering			10

	BEng(Hons) Mechanical and Offshore Engineering	10
Subject Benchmark Statements	QAA: Computing 170 03/07 para. 3 ff. (indirect); Engineering 114 06/06 pp. 1 ff.	
College Status	Affiliate College	
College Location	Garthdee Campus	
University Location	Garthdee Campus	
University Faculty	Design and Technology	
University School/s	School of Engineering	
Rationale	The partnership between the College and Robert Gordon University facilitates the acquisition of an undergraduate degree by international students who, because of their previous educational experience, are not normally able to gain direct access to the University's degree courses. The pathway has therefore been developed to satisfy important pedagogical issues: 1. To ensure that international students have a dedicated period of time, in a familial and safe setting, to adjust to and acquire the skills to prepare for further studies within a western learning environment. 2. To satisfy the University's quality protocols, which in turn are directed by the QAA Subject Benchmark requirements, for articulation purposes. 3. Facilitate access to a pathway leading to a University degree award.	

	4. Protect the entry tariff of the University to its degree courses and ensure that the University does not need to lower its entry tariff in order to increase its international student population. 5. Widen access and participation in higher education in line with the University's internationalisation agenda. 6. Commit to the provision of best practice customer service and student experience for international students and thus add value to the University's award winning student lifestyle. 7. Support the integrity of the University's QAA commitment by adopting and adapting the University's quality regime to form the basis of a robust, quality driven academic provision and administrative systems and processes. 8. Facilitate effective and efficient, low risk public/private partnership in line with the University's strategic research mission. 9. Enhance the global reach of the University into previously untapped markets and market segments. 10. Add resource, human and financial, to the University's marketing process. 11. Facilitate access to a global recruitment process. 12. Assist in the diversification of the student body. 13. Make available the benefits derived from access to Navitas' global reach and corporate marketing arm.

	14. Provide the University with third stream revenue via income flow from royalty payments each trimester and the ongoing pipeline revenue derived from fees paid by those students who progress to the University to complete their prescribed degree.
Educational Aims	The programme, First Year Degree in Engineering, has been devised in accordance with Navitas UK general educational aims along with those formulated for the College, see CPR 5, and the nominated outcomes desired by Robert Gordon University, School of Engineering, to impart a high quality of education in the disciplines required. The educational aims of the programme are to: 1. Prepare students, who would not normally be considered qualified, to an appropriate standard for entry into the School of Engineering at SCQF Level 8 of the prescribed undergraduate degree schemes. 2. To endow each individual with an educational pathway that augments opportunities for professional employment and development in the Engineering sector at both a national and international level. 3. Develop in students a fundamental knowledge and understanding that can demonstrate an understanding of the skills in both the theory and practice of engineering using scientific and engineering principles and techniques so as to support their transfer into SCQF Level 8 of the prescribed degree schemes.

	4. Develop in students an appreciation and desire to learn based on competent intellectual and practical skills building to a set of transferable skills that will support them in all aspects of their onward academic studies/careers and assist informed decision making. 5. Ensure that students have attained the prescribed level of inter-disciplinary language competence described as Level B2 'Independent User' by the Council of Europe, see Common European Framework of Reference for languages: Learning, teaching assessment 2001, Council of Europe, CUP, Cambridge, p. 24, Table 1. Common Reference Levels: global scale. 6. Ensure that graduates have attained the prescribed level of inter-disciplinary language competence to a minimum pass mark of 65% in the ACL accredited module Interactive Learning Skills and Communication, and therein a minimum 6.5 IELTS equivalent.

PROGRAMME

Title	First Year Degree in Engineering
SCQF	7
Credit Points	120
Duration of Study	Two (2) semesters
Weeks of Study	Twenty Six (26) weeks
Mode of Study	Full-time
Mode of Delivery	Face to Face
Notional Hours	1,350

Contact Hours	475	
Self-directed Study Hours	875	
Delivery Model	Standard Delivery Model (SDM)	
Language of Delivery	Delivery	English
	Assessment	English
	Council of Europe	Common language reference level B2 Independent User
	ACL Accreditation	Interactive Learning Skills and Communication
Intended Learning Outcomes	Generic: All modules have a set of Generic Learning Outcomes (LOs) attached to them, see relevant Definitive Module Documents (DMDs). These provide a basic set of core transferable skills that can be employed as a basis to further study and life-long learning. They are delivered using an interdisciplinary and progressive approach underpinned by the relevant Interactive Learning Skills and Communication (ILSC) module, to build these core skills within the context of subject-specific learning. Incorporated in these core skills are the key themes of relationship-management, time-management, professional communication, technological and numerical understanding and competency. The Generic LOs for the programme are tabled below:	
	Key knowledge will be demonstrated by:	Key skills will be demonstrated by the ability to:

	Personal organisation and time-management skills to achieve research goals and maintain solid performance levels.	Meet converging assessment deadlines – based on punctuality and organisation with reference to class, group and individual sessions within a dynamic and flexible learning environment with variable contact hours and forms of delivery.
	Understanding of the importance of attaining in-depth knowledge of terminology as used in a given topic area, as a basis to further study.	Communicate clearly using appropriate nomenclature to enhance meaning in all oral and written assessments with no recourse to collusion or plagiarism.
	Understanding, knowledge and application of appropriate and effective methods of communication to meet formal assessment measures.	Present clearly, coherently and logically in a variety of oral and written formats using a variety of appropriate qualitative and quantitative tools and evidence bases.
	Understanding and knowledge as to the development of the industry and/or scholarship in relation to a given topic under study.	Demonstrate an understanding of the current themes of a given topic, the academic and practical foundation on which they are based – demonstrated by a lack of plagiarism and need for collusion in both individual and group work.
	Understanding of the rules applying to plagiarism and collusion.	Collate, summarise, reason and debate/argue effectively on a given topic with appropriate reference to another's work or ideas/concepts.
	Ability to work as an individual, in a small team and in a larger group to effect data collation, discussion and presentation of evidence.	Meet and succeed in each of the varied assessments presented.
	<u>Specific:</u> Module-based LOs are described as Specific LOs and combine to make up the Intended LOs of the programme/stage of study. Specific LOs for a module are fully expressed in the relevant DMD and	

Module Guide (MG). Specific LOs for the majority of modules are blended from the relevant and current University Module Outlines at SCQF Level 7 to ensure parity, see Appendix 4 in this document. Note that the ILSC module includes aspects of: **EN1601** Product Development.

Intended:

Each programme/stage of study incorporates a set of Intended LOs to define the wider academic-based knowledge and skills acquisition. These key areas are described and tabled below:

A	Knowledge and Understanding		
	To obtain a knowledge and understanding:	Teaching/learning methods and strategies:	Assessment methods and strategies are tested via...
1	Recall and describe the basic concepts and theories of applied mechanics.	Acquisition of Intended LOs via a combination of small group lectures, group work (listening, writing and reading); small group-based tutorial labs/coursework and directed study (oral, reading, listening and written presentation); and individual coursework (oral, and written presentation) and summative examination (reading and writing). Additional support is provided through the provision of small peer-	A.1 to A.13 – a combination of summative (closed-book) examinations and summative coursework along with written assignments, in-course assessments/tests, computer-based coursework and tests, project reports, presentations and practicals. All students are required to maintain an 85% attendance record.
2	Recall and describe the basic concepts of thermodynamic properties and fluid statics.		
3	Recall and explain the characteristic behaviours of linear and digital services and their use in basic circuits.		
4	Recall and describe electromagnetic concepts and principles of electric circuit analysis.		

	5	Define and express introductory level mathematics to engineering problems.	led tutorial group work and of individual tutorial support; College module-specific subject specialists delivering modules; guest speakers (industry/topic specific); monitoring and appraisal by College academic management. Ensuring all students acquire grounding in Robert Gordon University and associated end-user IT platforms for academic study. The opportunity to interface regularly with noted platforms in College, Robert Gordon University library and independent environments to develop an understanding of the implications of the use of different e-learning for research. The Programme Specification, DMDs, Module Guide, reading lists, lecturers and notes, and assessment regimes	
	6	Describe computer systems and develop software in a high-level language.		
	7	Recall and express the skills needed to design, develop and evaluate solutions to engineering problems.		
	8	Develop fundamental skills in Information Technology.		
	9	Develop fundamental skills in the principles of engineering design process for product development.		
	10	Describe the skills used in the manufacture of engineering systems.		
	11	Recall and demonstrate the techniques and forms of effective and clear communication expressed		

		in a variety of academic and professional settings in accordance with Level B2 'Independent User' as described by the Council of Europe, see benchmarking documentation of this document for reference.	are available via the College e-learning portal for queries to be met. *Students are encouraged throughout the stage of study to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.* *Feedback is given to all students on all work produced and, where appropriate, confirmed in individual appraisal events associated with modules and specifically ILSC. Additional interviews are made with the tutor and/or the College academic services to evaluate and discuss any emerging learning issues and therein students options.*	
	12	The role and importance of the study of the history of scholarship as a basis to determining a full understanding, correct use of accurate nomenclature and an appreciation of fundamental concepts associated with a subject area.		
	13	The role and importance of OSH and the health and safety procedures/requirements within a laboratory environment.		
	B	Cognitive/Intellectual Skills		
		To obtain intellectual/cognitive skills with the ability to:	Teaching/learning methods and strategies	Assessment methods and strategies via...

	1	Make full use of library and College/University e-learning search (catalogue and bibliographic) resources as a support to analysis and formulation of problem solving and support ongoing discursive skills.	Acquisition of B.1 and B.2 via topic specific (information systems) small lab-based group lectures, group work and the additional support and guidance provided via the provision of small peer-led tutorial group work in differing environments. Ensuring all students acquire grounding in Robert Gordon University and associated end-user IT platforms for academic study. The opportunity to interface regularly with noted platforms in College, Robert Gordon University library and independent environments to develop an understanding of the implications of the use of different e-learning for research. Acquisition of B.2 to B.5 via a combination of small group lectures (listening, writing and reading); small group-based tutorial labs/coursework	B.1 to B.5 – a combination of summative (closed-book) examinations and summative coursework along with written assignments, portfolios and in-course assessments/tests, computer-based coursework and tests, project reports, presentations and practicals. All students are required to maintain an 85% attendance record.
	2	Apply basic research techniques to sourcing, selecting and evaluating appropriate information and technical data.		
	3	Integrate oral, written, listening, reading, non-verbal and diagrammatic skills to effect clear communication.		
	4	Ability to analyse and compare various modes of data/information using appropriate technical and numerical techniques.		
	5	Ability to begin to apply reasoned thinking, supported by evidence and/or appropriate techniques to design and develop solutions to conflicting sets of information,		

		technological problems and academic opinion.	and directed study (oral, reading, listening and written presentation); and individual coursework (oral, and written presentation) and summative examination (reading and writing). Additional support is provided through the provision of small peer-led tutorial group work and of individual tutorial support; College module-specific subject specialists delivering modules; guest speakers (industry/topic specific); monitoring and appraisal by College academic management.	
	C	Practical Skills		
		To obtain practical skills with the ability to:	Teaching/learning methods and strategies	Assessment methods and strategies via...
	1	Employ key communication skills appropriate to undergraduate study, inclusive of written, oral, reading, speaking, numerical, graphical and diagrammatic manipulation and presentation of information.	Communication skills are central to all teaching, class/lab-based learning and self directed study; these are tested out throughout all assessment practices. Students are encouraged to explore and develop variety of	Integrated themes used across the continuous assessment framework for the programme to test robust copability skills in a number of environments.

	2	Employ analytical skills and methodologies as a basis to further study.	communication skills, under pinned by the ILSC module.	A combination of summative (closed-book) examinations and summative coursework along with written assignments, portfolios and in-course assessments/tests, computer-based coursework and tests, project reports, presentations and practicals.
	3	Ability to begin to engage critically with regard to the underlying challenges facing engineering and associated sectors.	Application of the principles and themes throughout all core modules of the programme via examples and topics for assessment regimes.	Integrated themes used across the continuous assessment framework for the programme to test robust copability skills in a number of environments.
	D	Transferable Skills		
		To obtain transferable skills with the ability to:	Teaching/learning methods and strategies	Assessment methods and strategies via...
	1	Select, read, digest, summarise and synthesise information material in a variety of forms, both qualitative and quantitative (text, numerical data and diagrammatic) and in an appropriate manner to identify and determine key facts/themes and relevancy.	Embedded in all aspects of delivery and assessment structures is the need to disseminate information presented in a variety of forms and modalities. Using a combination of all delivery and assessment styles (oral and written, group and individual) used within the programme to demonstrate competence in presentation, reports,	A combination of summative (closed-book) examinations and summative coursework along with written assignments and in-course assessments, computer-based coursework, project reports, portfolios and presentations. Indicating an ability to effectively manage a complex and flexible timetable, combining a variety of delivery and assessment modes,
	2	Use and clearly communicate discursive, numerical, statistical and		

		diagrammatic ideas, concepts, results and conclusions using appropriate technical and non-technical language and language style, structure and form.	long and short essays (to enhance summarisation techniques and limit collusion and plagiarism), timed-assignments (indicating knowledge, organisation, time management and clear communication ability), of the following: design a persuasive message from the audience's perspective; demonstrate effective presentation delivery skills in a variety of situations; leave effective voice-mail messages; write persuasive E-mails, memos letters; and write factual essays and reports in plain English. These skills are reflective of in-context reading, writing, oral and speaking skills and enhanced language acquisition.	some of which are conflicting in submission and style (oral/written and individual/small group, to demonstrate effective organisation, self-reliance and time-management skills.
	3	Apply basic research and referencing techniques to all aspects of study, information collation, information presentation and formulation of academic opinion.		
	4	Embed the importance of self-study and reliance. This involves cultivating and developing a responsibility within each student to take cognizance for their own learning, initiative, effective time-management and self-discipline within the academic and professional environments.		
	5	Begin to develop a very good conceptual understanding and ability to evaluate the main aspects of information systems and commercial services, media,		

		graphics, internet and associated engineering sectors within the wider commercial and economic context.		
Assessment Regulations	Summary: The programme is compliant with both the generic assessment regulations of Navitas UK and those of the College, see CPR CS9. Each module within the programme/stage of study has an associated Module Outline that may be broadened into a Definitive Module Document (DMD) either of which will be provided to students at the beginning of their studies. These documents offer generic information on the Aims and Specific LOs of the subject/s under study, basic references and the attendance and notional contact requirements. They also include topics/subject areas of study and outlines of the assessment events. Each module has an associated textbook, as prescribed by the University's Module Outlines, and a specifically developed Module Guide (MG) which includes the types of assessment activities employed, teaching methods, resources, assessment criteria and expectations, contact details of the tutor/s, referencing (if applicable) and submission/completion requirements. Contained is also a detailed lecture-by-lecture schedule of subjects students can be expected to cover over the teaching period. This acts as a useful reference for study and revision purposes. All assessment is designed to reflect and measure both an individual's and a cohort's achievement against the Specific LOs of the module and Intended LOs of the programme.			

	In-course written, reading, listening and oral assessment is built in to all modules through general interaction between tutors and students, student peer review and small group tutorials or individual tutorials/appraisals. Modes of assessment include essay/report writing, oral presentation (group or individual, and poster), portfolio, and e-based, in-class or take home exercises/tests. All written assessments must follow certain criteria in style and submission as noted in the relevant Module Guides and Student Guide. This form of assessment is considered fundamental to a student's ability to communicate ideas and evidence with clarity, relevance and logic in a planned and organised manner. Plain writing style, syntax and grammar are core skills that can be enhanced to support the maturing of individual students' composition and thus academic and transferable proficiency. Oral presentations, whether part of formal or informal assessment practice, are encouraged within all modules as they promote, among others, transferable skills and can identify those students who may be plagiarising material. It is advised, however, that they should not make up more than 60% of the final module mark unless as part of the learning rational. Oral group presentations should ideally contain no more than five (5) students, unless specific reasoning is applied. Each member, irrespective of their role, should be awarded the same mark unless where obvious differentiation arises, for management of this process see CPR CS9. This form of expression should not be allocated more than fifty (50) minutes per group, with less than a 30% weighting. Time limits must be upheld by tutors so as to ensure all students have the same opportunity to perform. Furthermore, tutors ought to notify students as to the materials available to them before preparation takes place.

Final summative examination normally adheres to closed-book, invigilated, timed conditions and takes place during allocated exam periods of a programme. It represents a more abstract measure of a student's achievement as a consequence of the Specific LOs associated with a module. It is utilised as a key measure of quality in teaching standards and provides a basis to aspects of delivery and environment which takes place at the conclusion of a semester by College academic services, see CPR CS9. Marks indicated in the relevant DMDs cannot be referred. Only in extenuating circumstances, sickness, personal tragedy or in the possibility of a clerical error, will deferral take place, see CPR CS9.

Formal assessment modalities (coursework and examination, respectively), combine to produce the following weightings applied to any give module:

Coursework	Examination
100%	0%
80%	20%
70%	30%
60%	40%
50%	50%
40%	60%
30%	70%
20%	80%
0%	100%

Successful completion of a module is based on attaining the required overall pass grade prescribed. All students must achieve a grade B* in the Interactive Learning Skills and Communication (see DMD ILS003). The assessment mode for a given module is based on the desired Specific LOs, their expressions can be found in the relevant DMD. Students must be briefed at the beginning of each

	module as to which weightings are in use. They should also be clearly advised as to the marking criteria and, hence, the achievement requirements for each grade cluster. Where a student has a special need or disability, appropriate steps must be taken by the College, academic staff and/or internal/external invigilators to ensure that the need is recognised and a justified outcome identified, see CPR CS9. <u>Demonstration of achievement:</u> Students must pass all modules at the prescribed grade in order to progress to the next stage of their educational continuum, see Progression Criteria, below. <u>Categories of performance and grading levels</u>**:** A and A*(High Distinction) – Distinctive level of knowledge, skill and understanding which demonstrates an authoritative grasp of the concepts and principles and ability to communicate them in relation to the assessment event without plagiarism or collusion. Indications of originality in application of ideas, graphical representations, personal insights reflecting depth and confidence of understanding of issues raised in the assessment event. B and B* (Distinction) – Level of competence demonstrating a coherent grasp of knowledge, skill and understanding of the assessment and ability to communicate them effectively without plagiarism or collusion. Displays originality in interpreting concepts and principles. The work uses graphs and tables to illustrate answers where relevant. Ideas and conclusions are expressed clearly. Many aspects of the student's application and result can be commended.

	C (Credit) – Level of competence shows an acceptable knowledge, skill and understanding sufficient to indicate that the student is able to make further progress. The outcome shows satisfactorily understanding and performance of the requirements of the assessment tasks without plagiarism or collusion. Demonstrates clear expression of ideas, draws recognisable and relevant conclusions. D (Pass) – Evidence of basic competence to meet requirements of the assessment task and event without plagiarism or collusion. Evidence of basic acquaintance with relevant source material. Limited attempt to organise and communicate the response. Some attempt to draw relevant conclusions. F (Fail) – The student's application and result shows that the level of competence being sought has not yet been achieved. The assessed work shows a less than acceptable grasp of knowledge, skill and understanding of the requirements and communication of the assessment event and associated tasks. <u>Generic marking criteria:</u> Response – the response must address all parts of the question, that is not just a part or parts of the question. A response that is not specifically tailored to the needs of the question will not be accepted. Structure – the student has identified the main issues of the question and attached the appropriate emphasis to them; has stated their agreement accurately and in some detail; and has utilised the supporting data. Context – the student has displayed knowledge of the basic subject matter under assessment; has included only relevant material where required; has provided a written agreement or mathematical/numerical/diagrammatic/modelled statement and, in doing so, has addressed all

	aspects of it in reaching a conclusion; and has provided a clear understanding of a question in reaching a conclusion. Presentation – due credit, specified as a percentage of the marking criteria, will be given for a succinct and fluent writing style. Illegible material will not be given due credit, specified as a percentage of the marking criteria. Penalty – a student will be penalised if they have not tackled each issue of a question separately, stating their agreement and or rationalised progression, and then applying this to the facts; and will be penalised for not providing evidence of academically based reasoning in an answer. Sources – the student should provide accurate referencing; it is essential that a student does not plagiarise from any source, see CPR CS9.
Moderation	See CPR CS9 – summary: moderation is normally applied to each main assessment point of a module; the main assessment of a module is that with the highest weighting; moderation is inclusive of the instruments of assessment and scripts; scripts are moderated from a 30% sample and includes those with the highest, lowest and borderline percentiles; moderation is undertaken by a subject specialist from the School of Engineering, with the exception of ILSC which is subject to moderation by a subject specialist from Navitas UK.
Progression Criteria	See CPR CS9 – summary: minimum overall pass mark of 40% to be achieved in each module with a minimum pass mark of 35% in assessments weighted over 30% of a module assessment regime; with the exception of ILSC which requires a minimum pass mark of 65% achieved in all assessment events and a minimum 85% attendance record.

Failure to Progress	See CPR QS9 – summary: where a student fails a module assessment, they have the opportunity to re-sit that assessment; if the student fails the re-sit assessment a student may be granted the opportunity by the College Exam and Progression Board to re-take the entire module, at full cost. If a student fails to meet the Progression Criteria on the re-take of a module, they will be deemed to have failed the module and will be referred to the College Exam and Progression Board for a decision. The University will not be incumbent to progress students who fail.
Associated Documentation	With the exception of ILSC, all University prescribed modules form the basis of the curriculum, see Appendix 3 for the conversion of nomenclature – for the purpose of clarity, the University modules will be referred to under College module coding guidelines. See Appendix 4, for University Module Outlines.
	Definitive Module Documents (DMDs) as follows: DMDs ILS003; SCI108; SCI109; SCI110; SCI111; SCI112; SCI113; SCI114; SCI115; SCI116; SCI117
	Module Guides (MGs) as follows: [modules in process for 30 September]; MG/ILS003
	Associated teaching aids for a module as required
	Associated Student Handbook
	College Policies and Regulations (CPRs)
Human Resource	Sessional academics (tutors) – with appropriate qualifications, experience and abilities. Guest speakers – relevant industries as requested by the College.
Built Environment	All lectures/classes/labs and small group tutorials are held in the designated ICRGU class rooms, seminar rooms and dedicated IT laboratories; students are encouraged to use Robert Gordon

	University's library and e-learning facilities for self-directed study; students are encouraged to use their private IT facilities where possible; field-trips will be taken as required.
E-learning	College Portal; University Moodle; Library
Library	Sir Iain Wood Building: Library
Programme Framework	

First Year Degree in Engineering

Core Modules

Contact Hrs/Week	*College Module Code*	*Module Name*	*Credit Points*	*Pass Mark %*	*Exam %*	*Coursework %*
Semester 1						
3	ILS003	Interactive Learning Skills and Communication 3 (Part 1)				
4	SCI114	Statics & Dynamics	15	40	80	20
4	SCI115	Introduction to Electrical Engineering	15	40	70	30
4	SCI109	Mathematics 1	15	40	70	30
Semester 2						
3	ILS003	Interactive Learning Skills and Communication 3 (Part 2)	15	65	30	70
4	SCI112	Mathematics 2	15	40	70	30

4	SCI120	Design	15			
	SCI116	Thermofluids*	15	40	80	20
4	SCI110	Design, Manufacture and Development*	15	40	0	100
4	SCI118	Introduction to Digital Electronics & Microcontrollers **	15			
4	SCI119	Introduction to Analogue Electronics & Signals**	15			
Undergraduate Stage 1 : Engineering			**120 credit points**			

*** Mechanical (and Mechanical & Electrical) Engineering courses only**
****Electrical/Electronic Engineering courses only**

Management	The First Year Degree in Engineering programme is delivered by ICRGU on the Garthdee Campus of Robert Gordon University. This scenario seeks to provide the necessary resources to ensure that all students enrolled with ICRGU are afforded an educational experience that not only provides assimilation into campus and student life but is aligned with the standards and protocols of the University experience. The programme operates under and according to the general compliance structures determined by the Quality and Standards Office Navitas UK. This Office has oversight of all Navitas programmes operating

	in the UK. Any changes to a programme must be submitted via the normal Navitas UK processes through the Quality and Standards Office. The general operational management of the programme lies with ICRGU's academic services which assumes overall responsibility for the administrative and implementation functions. The ICRGU Director of Academic Services or nominee, is responsible for the day-to-day management of the programme inclusive of attendance monitoring. The various sessional academic module leaders/lecturers/tutors are responsible for the delivery and initial assessment of modules whilst appraisal of delivery and programme content is advised by the ICRGU Director of Academic Services or nominee in consultation with the Quality and Standards Office Navitas UK, the Head of the School of Engineering and associated appropriate Programme Directors/Leaders and/or Link Tutor. The Learning and Teaching Board of the College, is identified as responsible for candidate selection to the ICRGU First Year Degree in Engineering.
Monitoring and Review	Formal review of the First Year Degree in Engineering programme, takes place as an annual review in March/April between ICRGU, the Quality and Standards Office Navitas UK and representation from the School of Engineering. Strategic, logistical and operational issues are developed within the remit of the Academic Advisory Committee (AAC) held on a trimester basis and chaired by Robert Gordon University. Progression is determined via the ICRGU Board of Examiners. For a details of this review and quality management of this and all ICRGU programmes, see, CPR CS9.

	Informal Review takes place on a regular basis via interface between students, academic services and the teaching staff using both student surveys (inclusive of i-graduate) and teaching observation and ARQUE.
Entry Requirements	Standard and approved requirements for academic international benchmark qualifications, see CPR 3. English language entry is at CEFR level B2 in line with UKBA requirements for NQF6/SCQF10.
Appendix 1	Intended Learning Outcomes in the constituent modules – table inserted indicating direct mapping of LOs per module.
Appendix 2	Delivery schedule incorporating notional, contact and self-directed hours of study applied to each module and therein the programme.
Appendix 3	Module conversion codes and descriptors and module mapping by pathway.
Appendix 4	University Module Outlines for cross-check and parity.
Appendix 5	College DMDs.

Appendix 1

Development of Programme Learning Outcomes (LOs) in the Constituent Modules:

The tables below map where the intended LOs of the programme are assessed in the core/constituent modules. It provides an aid to (i) academic staff in understanding how individual modules contribute to the programme aims, (ii) a checklist for quality control purposes, and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses. **Key:** LOs which are assessed as part of a given module ✓✓; LOs which are not explicitly assessed as part of a given module ✓.

(SCQF 7)		Intended LOs												
		Knowledge and Understanding												
Core Modules	**Module Code**	**A.1**	**A.2**	**A.3**	**A.4**	**A.5**	**A.6**	**A.7**	**A.8**	**A.9**	**A.10**	**A.11**	**A.12**	**A.13**
Interactive Learning Skills and Communication 3	ILS003											✓✓	✓✓	✓✓
Physics 1	SCI108	✓✓	✓✓									✓	✓	✓✓
Physics 2	SCI111			✓✓	✓✓							✓	✓	✓✓
Mathematics 1	SCI109					✓✓						✓	✓	
Mathematics 2	SCI112					✓✓						✓	✓	
Design, Manufacture and Development	SCI110							✓✓		✓✓	✓✓	✓✓	✓✓	✓✓
Computing Skills	SCI113						✓✓		✓✓		✓✓	✓✓	✓✓	✓

Knowledge and understanding:

A.1	Recall and describe the basic concepts and theories of applied mechanics.
A.2	Recall and describe the basic concepts of thermodynamic properties and fluid statics.
A.3	Recall and explain the characteristic behaviours of linear and digital services and their use in basic circuits.
A.4	Recall and describe electromagnetic concepts and principles of electric circuit analysis.
A.5	Define and express introductory level mathematics to engineering problems.
A.6	Describe computer systems and develop software in a high-level language.
A.7	Recall and express the skills needed to design, develop and evaluate solutions to engineering problems.
A.8	Develop fundamental skills in Information Technology.
A.9	Develop fundamental skills in the principles of engineering design process for product development.
A.10	Describe the skills used in the manufacture of engineering systems.
A.11	Recall and demonstrate the techniques and forms of effective and clear communication expressed in a variety of academic and professional settings in accordance with Level B2 'Independent User' as described by the Council of Europe, see benchmarking documentation of this document for reference.
A.12	The role and importance of the study of the history of scholarship as a basis to determining a full understanding, correct use of accurate nomenclature and an appreciation of fundamental concepts associated with a subject area.
A.13	The role and importance of OSH and the health and safety procedures/requirement within a laboratory environment.

(SCQF 7)		**Intended LOs**												
		Intellectual Skills					**Practical Skills**			**Transferable Skills**				
ICRGU Core Modules	**Module Code**	**B.1**	**B.2**	**B.3**	**B.4**	**B.5**	**C.1**	**C.2**	**C.3**	**D.1**	**D.2**	**D.3**	**D.4**	**D.5**
Interactive Learning Skills and Communication 3	ILS003	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓✓
Physics 1	SCI108	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Physics 2	SCI111	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Mathematics 1	SCI109	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Mathematics 2	SCI112	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Design, Manufacture and Development	SCI110	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Computing Skills	SCI113	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓

Intellectual skills:

B.1	Make full use of library and College/University e-learning search (catalogue and bibliographic) resources as a support to analysis and formulation of problem solving and support ongoing discursive skills.
B.2	Apply basic research techniques to sourcing, selecting and evaluating appropriate information and technical data.
B.3	Integrate oral, written, listening, reading, non-verbal and diagrammatic skills to effect clear communication.
B.4	Ability to analyse and compare various modes of data/information using appropriate technical and numerical techniques.
B.5	Ability to begin to apply reasoned thinking, supported by evidence and/or appropriate techniques to design and develop solutions to conflicting sets of information, technological problems and academic opinion.

Practical skills:

C.1	Employ key communication skills appropriate to undergraduate study, inclusive of written, oral, reading, speaking, numerical, graphical and diagrammatic manipulation and presentation of information.
C.2	Employ analytical skills and methodologies as a basis to further study.
C.3	Ability to begin to engage critically with regard to the underlying challenges facing engineering and associated sectors.

Transferable skills:

D.1	Select, read, digest, summarise and synthesise information material in a variety of forms, both qualitative and quantitative (text, numerical data and diagrammatic) and in an appropriate manner to identify and determine key facts/themes and relevancy.
D.2	Use and clearly communicate discursive, numerical, statistical and diagrammatic ideas, concepts, results and conclusions using appropriate technical and non-technical language and language style, structure and form.
D.3	Apply basic research and referencing techniques to all aspects of study, information collation, information presentation and formulation of academic opinion.
D.4	Embed the importance of self-study and reliance. This involves cultivating and developing a responsibility within each student to take cognizance for their own learning, initiative, effective time-management and self-discipline within the academic and professional environments.
D.5	Begin to develop a very good conceptual understanding and ability to evaluate the main aspects of information systems and commercial services, media, graphics, internet and associated engineering sectors within the wider commercial and economic context.

Appendix 2

Teaching Rotations:

Semester 1

Week	Total Hours									
	ILS003 Interactive Learning Skills and Communication 3		**SCI109** Mathematics 1		**SCI114** Statics & Dynamics		SCI115 Introduction to Electrical Engineering		**Contact (Directed study) hours/week**	**Self-directed study hours/week**
	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study		
1	3	3	4	8	4	8	4	8	15	27
2	3	3	4	8	4	8	4	8	15	27
3	3	3	4	8	4	8	4	8	15	27
4	3	3	4	8	4	8	4	8	15	27
5	3	3	4	8	4	8	4	8	15	27
6	3	3	4	8	4	8	4	8	15	27
7	3	3	4	8	4	8	4	8	15	27
8	3	3	4	8	4	8	4	8	15	27
9	3	3	4	8	4	8	4	8	15	27
10	3	3	4	8	4	8	4	8	15	27
11	3	3	4	8	4	8	4	8	15	27
12	3	3	4	8	4	8	4	8	15	27
13	0	0	2	4	2	4	2	4	6	12
Total hours / module	36	36	50	100	50	100	50	100	186	336
Notional hours / module	**72**		**150**		**150**		150		**522**	
Credit Points	**7.5**		**15**		**15**		**15**		**52.5**	

Semester 2

Week	Total Hours													
	ILS003 SCI113 Interactive Learning Skills and Communication 3		**SCI105** Design Manufacture & Development		**SCI117** Introduction to Electronics (Electrical students only)		SCI112 Maths 2		SCI116 Thermofluids (Mechanical students only)		SCI113 Computing Skills		**Contact (Directed study) hours/week**	**Self-directed study hours/week**
	Contact hours (Directed study)	Self-dir Study	Contact hours	Self-dir Study	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study	Contact hours (Directed study)	Self-dir Study		
1	3	3	4	8	4	8	4	8	4	8	4	8	23	43
2	3	3	4	8	4	8	4	8	4	8	4	8	23	43
3	3	3	4	8	4	8	4	8	4	8	4	8	23	43
4	3	3	4	8	4	8	4	8	4	8	4	8	23	43
5	3	3	4	8	4	8	4	8	4	8	4	8	23	43
6	3	3	4	8	4	8	4	8	4	8	4	8	23	43
7	3	3	4	8	4	8	4	8	4	8	4	8	23	43
8	3	3	4	8	4	8	4	8	4	8	4	8	23	43
9	3	3	4	8	4	8	4	8	4	8	4	8	23	43
10	3	3	4	8	4	8	4	8	4	8	4	8	23	43
11	3	3	4	8	4	4	4	8	4	8	4	8	23	43
12	3	3	4	8	4	8	4	8	4	8	4	8	23	43
13	3	3	2	4	2	4	2	4	2	4	2	4	16	23
Total hours / module	39	39	50	100	50	100	50	100	50	100	50	100	289	539
Notional hours / module	**78**		**150**		**150**		**150**		**150**		**150**		**828**	
Credit Points	**7.5**		**15**		**15**		**15**		**15**		**15**		**82.5**	

Appendix 3

SCQF Level 7 – Engineering – Module Conversion				
Core Modules		**Credit Points**	**% Examination**	**% Coursework**
Robert Gordon University (RGU) Module Code / Module Name	**College Module Code /Module Name**			
EN1700 Statics and Dynamics	**SCI114** Statics & Dynamics	15	*80*	*20*
EN1702 Thermofluids 1	**SCI116** Thermofluids * (Mechanical students only)	15	*80*	*20*
EN1512 Introduction to Analogue Electronics and Signals	**SCI117** Introduction to Electronics * (Electrical students only)	15	*80*	*20*
EN1513 Introduction to Digital Electronics and Microcontrollers	**SCI113** Computing Skills	15	*0*	*100*
EN1560 Introduction to Electrical Engineering	SCI115 Introduction to Electrical Engineering	15	*80*	*20*
CM1901 Mathematics 1A	**SCI109** Mathematics 1	15	*70*	*30*
CM1902 Mathematics 1B	**SCI112** Mathematics 2	15	*70*	*30*
EN1701 Introduction to Design, Materials and Manufacture	**SCI110** Design, Manufacture and Development	15	*0*	*100*
EN1601 Product Development	**ILS003** Interactive Learning Skills and Communication 3	15	*30*	*70*
EN1600 Professional Skills				
Stage 2: Engineering Pathway		**120 Credit Points**		

Appendix 4

Robert Gordon University Module Outlines for cross check and parity:

Module Title : Professional Skills
Keywords
IT, Communication, Information Retrieval, Engineering Laboratory and Engineering Applications Skills, Product Design and Production, Teamwork.
Reference EN1600
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved March 2004 / Amended February 2004
Revision No. 2
This Module Revision is not Validated

Prerequisites for Module
Laboratory safety passport, basic keyboard skills, familiarity with personal computer network procedures.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To develop and apply skills in Information Technology (IT), written and oral communication, information retrieval, engineering laboratory and workshop practice and engineering applications.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Use IT, communication and information retrieval skills in engineering laboratory and project work.
2. Demonstrate competence in the use of engineering laboratory instrumentation, techniques and procedures.
3. Design, manufacture and assemble an electro−mechanical product.

Indicative Module Content
IT skills: familiarity with word−processing, spreadsheet, database, presentation and web−browsing tools. Written communication skills: principles and practice of maintaining a laboratory logbook, report writing, essay writing, abstracting, referencing, drawing conclusions and making recommendations. Oral communication skills: principles and practice of presentations, style, use of visual aids, answering and asking questions. Information retrieval skills: identification of primary sources of information, accessing library resources and electronic databases, citing reference sources. Engineering laboratory skills: use of laboratory instruments, principles of operation, sources or error, metrology, laboratory techniques and procedures. Engineering applications skills: Electronic/electrical − soldering, component assembly, inter−wiring, mains wiring; Mechanical engineering − drawing, sheet metal manufacture, fastening techniques. Project: design, manufacture and assembly of an electro−mechanical product. "Great egg race" competition.

Indicative Student Workload
Contact Hours Distance Learning
Assessments 3
Lectures/seminars 22
Practical Exercises 45
Directed Study
Directed Study 40
Private Study
Private Study 40

Mode of Delivery
The module will be delivered by means of paper based material with online tutor support.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3
Component 2 1,2,3
Component 1 is a logbook of Practical Activities (result given as a grade A..F)
Component 2 is an average of the grades awarded for the
Communications Component and for completion of the Practical
Project Work (result given as a grade A..F)

Indicative Bibliography
1. Selection of British Standards and Codes.

2. LOVEDAY, G.C., 1995. Electronic Testing and Fault Diagnosis. 2nd ed. Harlow: Longman.
3. Manuals and other technical literature will be made available on loan as appropriate.

Module Title : Mathematics 1A

Keywords
Basic Algebra, Trigonometry, Complex Numbers, Calculus.
Reference CM1901
SCQF Level SCQF 7/ SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved June 2002 / Amended April 2005
Revision No. 3

Prerequisites for Module
Entry requirements normally include a pass in SQA Higher Grade Mathematics.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To provide the student with the ability to apply introductory level mathematics to engineering problems.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Solve algebraic and trigonometric equations by manipulation and use of formulae.
2. Apply vectors to problems in engineering mathematics, including the calculation of scalar and vector products.
3. Carry out basic operations on complex numbers and calculate their powers and roots.
4. Use standard techniques to differentiate elementary functions and apply them to problems in engineering.

Indicative Module Content
The syllabus will include:
Elementary algebra: The rules of indices and logarithms. transposition of formulae. The solution of linear, quadratic and simple simultaneous linear equations. The use of partial fractions. Simple binomial expansions. Trigonometry: Pythagoras' theorem. The definitions of the trigonometric functions. Application of the Sine and Cosine rules. The combination of simple waveforms using standard trigonometric formulae. Vectors: Simple vector algebra. The scalar and vector products. Application to engineering problems. Complex numbers: The arithmetic of complex numbers. Rectangular and polar forms. The Argand diagram. De Moivre's theorem and complex roots. Differential Calculus: Differentiation of elementary functions. The rules of differentiation: chain rule, product rule, quotient rule. The Taylor series for elementary functions. Applications to problems in engineering.

Indicative Student Workload
Contact Hours Full Time
Lectures 36
Tutorials 36
Assessment 6
Directed Study
Directed Study 30
Private Study
Private study 42

Mode of Delivery
The module is lecture and tutorial based.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3,4
Component 2 1,2,3,4
Component 1 − This is a closed book examination.
Component 2 − Coursework

Indicative Bibliography
1. STROUD, K.A. AND BOOTH, D.J., 2001. Engineering Mathematics, 5th ed. Palgrave.

Module Title : Statics and Dynamics

Keywords
Free−body diagrams, Equilibrium, Stress and Strain. Kinematics, Kinetics, Friction, Work, Power &Energy.
Reference EN1700
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5

Created December 2003 / Approved March 2004 / Amended May 2006
Revision No. 3
This Module Revision is not Validated

Prerequisites for Module
None in addition to the course entry requirements.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To enable the student to understand the basic concepts and theories of applied mechanics.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Investigate the actions of forces and moments and the concept of equilibrium; identify and explain tensile and compressive loading and the associated linear stress−strain relationship.
2. Analyse forces and moments on beams and pin−jointed structures.
3. Analyse the kinematics of simple translation and rotational systems, kinetics of rigid bodies and apply the concepts of work, power and energy.
4. Investigate friction, mass moment of inertia and the dynamics of simple systems.

Indicative Module Content
Forces, moments and equlibrium. Load analysis of plane, pinned frames (trusses). Shear forces and bending moments in beams.
Simple tensile, compressive and linear−elastic material behaviour.
Rectilinear and curved path motion of particles including non−constant acceleration case. Newton's Laws applied to rigid body kinetics of linear and circular motion systems including the effect of friction. Mass moment of Inertia. Impulse and momentum.

Indicative Student Workload
Contact Hours Distance Learning
Assessment 3
Lecture 24
Supervised Practical Work 6
Tutorials 16
Directed Study
Group and Individual work 20
Private Study
Private study 81

Mode of Delivery
The module will be delivered by means of paper based material with online tutor support, supplemented by industrial visits/industry speakers.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,4
Component 2 1,2,3,4
Component 1 involves two laboratory based courseworks. One covers statics and the other covers dynamics.
Component 2 is a closed book examination.

Indicative Bibliography
1. HEARN, E. J., 1997. Mechanics of Materials Volume 1. 3rd ed. Oxford: Butterworth−Heinemann.
2. MERIAM, J. L. and KRAIGE, L. G., 2002. Engineering Mechanics (Statics and Dynamics). 5th ed. New York: Wiley

Module Title : Mathematics 1B

Keywords
Matrices, Integration, Statistics, Computer Mathematics Packages
Reference CM1902
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved June 2002 / Amended April 2005
Revision No. 2

Prerequisites for Module
Mathematics 1A (CM1901) or equivalent.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To provide the student with the ability to apply futher introductory level mathematics to engineering problems.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Apply matrix techniques to the solution of simultaneous linear equations.
2. Calculate and understand simple descriptive and summary statistics, and apply elementary probability theory to problems in engineering.
3. Use standard techniques to integrate elementary functions with application to problems in engineering.
4. Use a computer mathematics package to carry out the operations, where appropriate, in 1 −3 above.

Indicative Module Content
The syllabus will include:
Introduction to the use of a computer mathematics package for problems in engineering mathematics.
Matrices: Simple matrix algebra. Determinants. Applications to the solution of simultaneous linear equations.
Integration: Use of tables of antiderivatives. The properties and applications of definite integrals. The rules of integration: integration by substitution, integration by parts, the use of partial fractions.
Power series for elementary functions.
Statistics: Simple descriptive statistics. Probability and reliability.
Elementary probability distributions. Applications to problems in engineering.

Indicative Student Workload
Contact Hours Full Time
Lectures 24
Tutorials 24
Computing Laboratories 10
Assessment 6
Directed Study
Directed Study 30
Private Study
Private Study 56

Mode of Delivery
The course is lecture and tutorial based.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3
Component 2 1,2,3,4
Component 1 − This is a closed book examination.
Component 2 − Coursework

Indicative Bibliography
1. STROUD, K.A., 2001. Engineering Mathematics. 5th Ed. Palgrave.

Module Title：Introduction To Electrical Engineering
Keywords
Electric circuits, Alternating current, Direct current, Electromagnetism
Reference EN1560 / SCQF Level SCQF 7 / SCQF Points 15/ ECTS Points 7.5
Created January 2004 /Approved March 2004 / Amended /Revision No. 2
This Module Revision is not Validated

Prerequisites for Module
None in addition to course entry requirements.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To provide the student with the ability to understand electromagnetic concepts and the principles of electric circuit analysis.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:
1. Explain basic electrostatic concepts, describe the physicalstructure of a capacitor and calculate the capacitance of a simple capacitor.
2. Explain basic electromagnetism concepts, calculate the inductance of a simple magnetic circuit.
3. State the basic dc circuit theorems and use the theorems to analyse a simple dc circuit.
4. Solve simple ac circuits problems having R, L and C elements.

Indicative Module Content
Basic concepts of electrostatics, electric charge, electric flux, electric field strength, potential and potential difference; Definition of capacitance, parallel plate capacitor.
Basic concepts of electromagnetism, magnetic field, magnetic field density, magnetic field strength, Ampere's law, Principles of magnetic circuits and inductance of a simple magnetic circuit.
Faraday's law of electromagnetic induction.
Electric circuits, circuit concepts, voltage and current sources, resistance, current flow and potential distribution. Ohm's and Kirchhoff's laws, simple circuit analysis using Kirchhoff's laws.
Reasons for use of alternating current for light and heavy current applications, choice of sinusoidal waveform. Inductive capacitive impedance concepts, simple time domain analysis of ac circuits, phasor representation of ac quantities, rms representation of voltage and current.

Indicative Student Workload
Contact Hours Distance Learning

Assessment 3
Lectures 24
Tutorials 24
Directed Study
Directed Study 48
Private Study
Provate Study 51

Mode of Delivery
The module will be delivered by means of paper based material with online tutor support, supplemented by industrial visits/industry speakers.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3,4
coursework consisting of two closed−book in−class assessments (equally weighted)

Indicative Bibliography
1. BIRD, J. O., 2003. Electrical Circuit Theory and Technology. Rev 2nd ed. Oxford: Newnes
2. FLOYD, T., 2003. Digital Fundamentals. 8th Edition, Upper Saddle River, NJ: Prentice Hall.
3. MORRIS, N., 1994. Electrical and Electronic Engineering Principles. Harlow: Pearson/Prentice Hall.
4. STOREY, N., 1998. Electronics − A Systems Approach. 2nd Edition. London: Addison−Wesley.

Module Title : Product Development

Keywords
Engineering Systems, Drawing, Design, Manufacture, Workshop, Teamwork and Decision Making Skills
Reference EN1601
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved March 2004 / Amended August 2008
Revision No. 3
This Module Revision is not Validated

Prerequisites for Module
EN1600 (Professional Skills) or equivalent

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
The aim of this module is to extend the skills introduced in Professional Skills module. The student will be able to apply basic design philosophy and demonstrate/describe the skills and techniques required/used in the manufacture of engineering systems.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Work effectively as a member of a project group.

2. Design, assemble and test a product.
3. Present information in written, oral and visual form.
4. Demonstrate knowledge of the legal responsibility of employers and issues related to health and safety, social factors and the environment.

Indicative Module Content
This module will enhance the student's hands−on engineering skills via laboratory and workshop activities leading to management and design of a structured project. The project will be used as the vehicle to:
1. Give the student a realistic exercise in engineering practice, i.e. understanding of project management, design evaluation, manufacturing principles, assembly and test procedures.
2. Integrate the knowledge gained in the other subject areas and to introduce appropriate theory.
3. Allow the exercise of decision making and showing personal qualities, such as initiative, imagination and creativity.
4. Provide an opportunity to assess the student's ability under a simulated situation.
5. Provide an insight to industrial organisation and practices.
The student will be expected to adhere to the principles of safe working practice. Team working will be encouraged throughout this module.

Indicative Student Workload
Contact Hours Distance Learning
Lecture/guest speaker 22
Directed Study
Supervised workshop/lab practice 50
Private Study
Private Study 78

Mode of Delivery
The module will be essentially student centred and will be supported by demonstration, guest speaker presentations and video where these are felt to be appropriate. It will involve the student working in a team to tackle problems relating to real engineering (or networking)products. The student will be given set objectives and will in general be expected to follow prescribed procedures. The module will be delivered by means of paper based material with online tutor support.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3,4
Component 2 1,2,3,4
Logbook and Group Report (marked as a grade A..F)
Oral Presentation and Demonstration (marked as a grade A..F)

Indicative Bibliography
1. Manuals and other literature will be made available on loan as appropriate. There is no further recommended reading.

Additional Notes
The student will be expected to provide suitable clothing for laboratory and workshop activities as designated by University staff.

Module Title：Introduction To Design, Materials And Manufacture
Keywords
Mechanical and Electrical Engineering Systems, Product Development, Design, Manufacture, Workshop, Teamwork and Decision Making Skills.
Reference EN1701 / SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created January 2004 / Approved March 2004 / Amended July 2007 / Revision No. 3
This Module Revision is not Validated

Prerequisites for Module
EN1600 Professional Skills or equivalent

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
The aim of this module is to provide an understanding of the principles and practice of the role of the engineer in new Product development. The student will be able to combine this understanding with basic skills in the analysis of examples of existing products.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Apply engineering design methods to analyse design examples.
2. Explain the selection of materials and process in existing examples of products.
3. Assess the influence of customer and organisational needs and constraints on the design process.
4. Demonstrate effective group working and communication skills.

Indicative Module Content
This module will be activity centred and will introduce the student to the principles of the engineering design process for product development. It will develop the principles of design as a process of meeting both customer and organisational needs while taking account of constraints. It will demonstrate the inter−relationship of design, materials, manufacture and test and how these relate to other non−technical factors. Students will learn the principles of materials technology including the structure and properties of representative engineering materials. Similarly, students will gain an understanding of the main manufacturing processes and their capabilities and limitations. These principles will be applied in activities which will demonstrate the principles of inventive but realsitc design and the criteria for the selection of materials and processes. The principles will be applied in context and the students will consider how market criteria and organisational imperatives affect the optimum solution to a design problem.

Indicative Student Workload
Contact Hours Distance Learning
Lecture / guest speaker 44
Directed Study
Supervised workshop / Lab 50
Private Study
Private Study 56

Mode of Delivery
The module will be essentially student centred but will be supported by lecture, demonstration, industrial visits and video
where these are felt to be appropriate. It will involve the student working in a team to tackle problems relating to real electrical / mechanical engineering products. The student will be given set objectives and will in general be expected to follow prescribed procedures. The module will be delivered by means of paper based material with online tutor support.

Assessment Plan
Learning Outcomes Assessed
Coursework 1,2,3,4
There will be three elements of coursework: Assessment will be based on practical work and on written and oral presentations of the work carried out. Students will be expected to demonstrate creative but realistic application of the principles of engineering design.

Indicative Bibliography
1. ULRICH, K. T. and EPPINGER, S.D., 2003. Product Design and Development. 3rd ed. New York: McGraw−Hill.
2. HAWKES, B. and ABINETT, R., 1984. The Engineering Design Process. London: Longman.
3. TIMINGS, R.L, 2000. Manufacturing Technology: volume 1. 3rd ed. Harlow: Longman.
4. CALLISTER W.D., 2003. Materials Science and Engineering. 6th ed. New York: Wiley

Module Title : Introduction to Computer Engineering

Keywords
Computer Architecture, Computer Peripherals, Operating Systems, Software Development, High−level Language
Reference EN1540
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved March 2004 / Amended July 2008
Revision No. 2

Prerequisites for Module
Basic keyboard skills, familiarity with personal computer network procedures.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To provide the student with the ability to describe computer systems and to develop structured software in a high−level language.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Describe the structure of a computer system and explain its principles of operation.
2. Design solutions to specified software problems.
3. Develop structured programs in a high−level language that are documented to prescribed standards.

Indicative Module Content
Introduction to computer systems: system block diagram, CPU, memory, input/output unit, system clock; data, address and control buses, peripheral devices, computer classification, application areas, operating systems, networks. Software development: software design, standards and documentation, algorithms and data structures, source and object code, compilers, the edit−compile−execute cycle, testing and debugging.

Syntax of a high level language: constants and variables, data types, program statements, selection and repetition control structures, library and user functions, arrays.

Indicative Student Workload
Contact Hours Full Time
Lectures 12
Practical 24
Tutorials 12
Directed Study
Directed Self Study 27
Private Study
Private Study 75

Mode of Delivery
This module is taught using a structured programme of lectures, tutorials, student−centred learning and practical exercises, which will include a software design exercise.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3
Component 2 1
Component 3 2,3
Component 1. Logbook.
Component 2. In−class tutorials.
Component 3. In−class programming assessment.

Indicative Bibliography
1. BRONSON, G.J., 1999. A First Book of C++: From Here to There. 2nd ed. Pacific Grove, CA: Brooks/Cole.

Module Title : Introduction to Electronics
Keywords
Transistors, Operational Amplifiers, Boolean Algebra, Logic Circuits, CAD
Reference EN1510
SCQF Level SCQF 7 / SCQF Points 15 / ECTS Points 7.5
Created May 2002 / Approved September 2004 / Amended May 2006
Revision No. 3
This Module Revision is not Validated

Prerequisites for Module
None, in addition to course requirements

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To provide students with the ability to understand the characteristic behaviour of linear and digital devices and their use in basic circuits.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Describe qualitatively and quantitatively, semiconductor devices.
2. Design basic analogue electronic circuits.
3. Design basic digital circuits.

Indicative Module Content
Signal types, sources, characteristics, measurement and interpretation. Diode, transistor and operational amplifier terminal characteristics. Bipolar and MOSFET devices. Amplifier design and analysis methodologies. Boolean algebra, truth tables, Karnaugh maps (up to 4 variables). Synthesis and analysis of basic combinational circuits using logic gates. Introduction to flip−flops. Registers and asynchronous counters. Use of analogue and digital CAD software.

Indicative Student Workload
Contact Hours Distance Learning
Assessments 5
Lectures/Tutorials 36
Practical Exercises 12
Directed Study
Directed Study 36

Private Study
Private Study 61

Mode of Delivery
The module will be delivered by means of paper based material with online tutor support, supplemented by industrial visits/industry speakers.

Assessment Plan
Learning Outcomes Assessed
Component 1 1,2,3
Coursework consisting of closed−book in−class assessments and submission of laboratory logbook

Indicative Bibliography
1. BIRD, J.O., 2003. Electrical Circuit Theory and Technology. Rev 2nd ed. Oxford: Newnes
2. FLOYD, T., 2003. Digital Fundamentals. 8th Edition, Upper Saddle River, NJ: Prentice Hall.
3. MORRIS, N., 1994. Electrical and Electronic Engineering Principles. Harlow: Pearson/Prentice Hall.
4. STOREY, N., 1998. Electronics − A Systems Approach. 2nd Ed. London: Addison−Wesley.

Module Title: Thermofluids 1

Keywords
Thermofluid properties, thermodynamic processes. Hydrostatics, Pressure measurement, Buoyancy forces, Stability.
Reference EN1702/SCQF Level SCQF 7/SCQF Points 15/ECTS Points 7.5
Created March 2006 /Approved May 2006 /Amended August 2007
Revision No. 3
This Module Revision is Pending Validation

Prerequisites for Module
None in addition to the course entry requirements.

Corequisite Modules
None.

Precluded Modules
None.

Aims of Module
To enable the student to understand the basic concepts and theories of Thermodynamic Properties and Fluid Statics.

Learning Outcomes for Module
On completion of this module, students are expected to be able to:
1. Identify key thermodynamic properties of gases and vapours.
2. Apply thermodynamic principles to analyse simple systems and processes.
3. Explain key fluid properties and methods of measuring pressure.
4. Analyse problems involving hydrostatics.

Indicative Module Content
Units and dimensions. Thermodynamic systems, properties of gases and vapours, processes, energy, heat and work transfers. Fluid properties, Hydrostatics, Pressure distribution in fluids at rest, Measurement of pressure, Forces on plane and curved surfaces, Buoyancy and Stability.

Indicative Student Workload
Contact Hours Full Time Part Time
Assessment 3 3
Lecture 24 24
Supervised practical work 3 3
Tutorials 24 24
Private Study
Private study 96 96

Mode of Delivery
The module is delivered by means of lectures, tutorials and guided self−study and is integrated with applications within the laboratory.

Assessment Plan
Learning Outcomes Assessed
Component 1 2,4
Component 2 1,2,3,4
Component 1 is coursework which involves two laboratory based assignments. (30% weighting)
Component 2 is a closed book examination. (70% weighting)

Indicative Bibliography

1. CLIFFORD, MICHAEL, et al, 2009. An Introduction to Mechanical Engineering Part 1. Hodder Education.