Newcastle University	**PROGRAMME SPECIFICATION**	SIT Singapore Institute of Technology

1	**Awarding Institution**	Newcastle University and Singapore Institute of Technology
2	**Teaching Institution**	Newcastle University and Singapore Institute of Technology
3	**Final Award**	BEng Honours
4	**Programme Title**	Electrical Power Engineering
5	**UCAS/Programme Code**	1412U
6	**Programme Accreditation**	By Singapore Engineering Accreditation Board with SIT's M.Sc in EEE
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	6
9	**Last updated**	October 2021

10 Programme Aims

- To provide opportunities for students to undertake a broad-based education in electrical power engineering and to acquire appropriate knowledge and understanding of engineering and key skills,
- To produce graduates who will be equipped to enter employment in industry, the professions or public service, or to follow a postgraduate route into research, industry or academia, or apply the skills learnt in a range of areas other than engineering,
- To produce graduates who will meet the accreditation requirements of the Institution of Engineering and Technology, subject to the completion of matching studies,
- To provide a qualification which meets the UK's FHEQ at Honours level of the National Qualifications Framework and meets the requirements of the National Subject Benchmarks in Engineering.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes (US, EA, D, P, S prefixes) have references to the UK-SPEC learning outcomes which are referenced in the UK QAA benchmark statements for Engineering. These are interpreted in the subject-specific form defined by the IET. The generic skills (T prefix) have references to the UK-SPEC general learning outcomes and QCA key skills at levels 4 and 5. The programme outcomes have been additional referenced to the Singapore Engineering Accreditation Board (EAB) required Student Learning Outcomes.

Underpinning Science And Mathematics	
US1	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current, and future developments and technologies

US1m	A comprehensive understanding of the scientific principles of own specialisation and related disciplines;
US2	Knowledge and understanding of mathematical principles necessary to underpin their education in their engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.
US2m	An awareness of developing technologies related to own specialisation
US3	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline
US3m	A comprehensive knowledge and understanding of mathematical and computer models relevant to the engineering discipline, and an appreciation of their limitations.
US4m	An understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects
	Teaching and Learning Methods
US	The primary means of imparting knowledge and understanding of fundamental mathematics, science and engineering principles (US1-US4m) is lectures. These are supplemented by example classes and (in stage 1) by small group tutorials which enable students to check their learning. Practical lab work reinforces learning (US1, US2). Throughout the course students are encouraged to supplement taught material by independent reading, for which they are given extensive support and guidance on reading materials and how to use them.
	Awareness of new developments (US2m) is acquired through examples in lectures and project work in the latter stages. Knowledge of other engineering disciplines (US3) is acquired through Engineering Mathematics which includes examples from a range of disciplines and through mechanical engineering and physics concepts covered in topics such as electrical machines and semiconductor devices. Mathematical and computer modelling skills (US3m) are acquired through lectures and practical programming exercises in MATLAB and C and through CAD tools in project work. Concepts in areas outside engineering (US4m) are learned through lectures in accountancy and law and through project work.
	Assessment Strategy
	Testing the knowledge base is through a combination of unseen written examinations and assessed coursework (US1-US4m) in the form of laboratory reports, coursework reports, project reports and presentations.
Engineering Analysis	
EA1	Understanding of engineering principles and the ability to apply them to analyse key engineering processes.
EA1m	An ability to use fundamental knowledge to investigate new and emerging technologies.
EA2	Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
EA2m	Ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases.
EA3	Ability to apply quantitative methods and computer software relevant to their engineering discipline, in order to solve engineering problems.
EA3m	Ability to extract data pertinent to an unfamiliar problem, and apply in its solution using computer based engineering tools when appropriate.
EA4	Understanding of and ability to apply a systems approach to engineering problems.

	Teaching and Learning Methods
EA	Analytical skills (EA1, EA3) are developed through worked examples in lectures and small group teaching (at stage 1), and solving tutorial problems. Mathematical and computer modelling (EA3, EA2, EA2m, EA3m) is used in project work to solve engineering problems. Student are encouraged to learn a systems approach (EA4) by applying principles taught in lectures to their project work. Knowledge of emerging technologies is imparted through lectures and students carry out investigations into aspects of these during literature studies and project work.
	Assessment Strategy
	Analysis and problem solving skills (EA1-EA4) are assessed through written examinations and coursework and through project work, which appears throughout the course.
Design	
D1	Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues;
D1m	Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D2	Understand customer and user needs and the importance of considerations such as aesthetics;
D2m	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs
D3	Identify and manage cost drivers
D4	Use creativity to establish innovative solution;
D5	Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal;
D6	Manage the design process and evaluate outcomes.
	Teaching and Learning Methods
D	Design skills (D1, D2, D3, D5, D6 and D1m) are learned from lectures and practised in project work and paper design exercises. Students are supported in developing creativity (D4, D2m) during project work.
	Assessment Strategy
	Design skills (D1, D2, D3, D5, D6 and D1m) are assessed through laboratory project reports, assignments and dissertations, presentations and written examinations.
.	Creative skills (D4,D2m) are mainly assessed through coursework and project work reports and presentations
Economic, Social, And Environmental Context	
S1	Knowledge and understanding of commercial and economic context of engineering processes;
S1m	Extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately
S2	Knowledge of management techniques, which may be used to achieve engineering objectives within that context;
S2m	The ability to make general evaluations of commercial risks through some understanding of the basis of such risks
S3	Understanding of the requirement for engineering activities to promote sustainable development;
S4	Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues;

S5	Understanding of the need for a high level of professional and ethical conduct in engineering.
	Teaching and Learning Methods
S	Knowledge of management techniques and practices (S2, S1m and S2m) is imparted through lectures and practised through business exercises and project work. An understanding of ethical issues (S5) is imparted by lectures and developed through group discussions. Knowledge of social, legal, environmental and economic implications of engineering activities (S1,S3,S4) is imparted through lectures on engineering topics and on accountancy, finance and law and business management. Students are encouraged to develop further awareness in project work, particularly the group projects and industrial project.
	Assessment Strategy
	Knowledge of management techniques and practices (S2, S1m and S2m) is assessed by written examinations, group project reports and business exercise reports. Understanding of ethical issues (S5) is not assessed directly. Knowledge of social, legal, environmental and economic implications of engineering activities (S1, S3 and S4) is assessed by examinations, project reports and business exercise reports.
Engineering Practice	
P1	Knowledge of characteristics of particular materials, equipment, processes, or products.
P1m	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments;
P2	Workshop and laboratory skills.
P2m	Extensive knowledge and understanding of a wide range of engineering materials and components.
P3	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology development, etc).
P3m	Ability to apply engineering techniques taking account of a range of commercial and industrial constraints.
P4	Understanding use of technical literature and other information sources.
P5	Awareness of nature of intellectual property and contractual issues.
P6	Understanding of appropriate codes of practice and industry standards
P7	Awareness of quality issues.
P8	Ability to work with technical uncertainty.
	Teaching and Learning Methods
P	Experimental skills (P2) are developed by carrying out laboratory experiments and constructing practical projects. Knowledge of materials, products and processes (P1 and P2m) is imparted through lectures and through open-ended project work. Students are encouraged to 'learn by doing'. An understanding of the industrial and commercial application of engineering practice and some practical limitations (P1m, P3, P3m, P5, P6, P7 and P8) is achieved through open-ended project work including an industrial project. Students also learn how to use information sources such as technical literature (P4) during these projects. An awareness of intellectual property and contractual issues is also imparted through lectures in business management, accountancy and law.

	Assessment Strategy
	Assessment of practical skills (P1, P2 and P2m) is through observed laboratory work, laboratory and project report writing and assessed presentations and demonstrations. Skill P4 is assessed directly by literature study report and by integration into project and laboratory reports. Understanding of industrial and commercial practice (P1m, P3, P3m, P5, P6, P7 and P8) is assessed through industrial project presentation and report and through extended coursework.
General Transferable Skills	
T1	Plan, conduct and report a programme of investigative work.
T1m	Develop, monitor and update a plan or programme of work, to reflect a changing operating environment;
T2	Communicate effectively in writing, verbally and diagrammatically (E, C).
T3	Give oral presentations using a variety of visual aids (E).
T4	Apply mathematical skills (E).
T5	Work as a member of a team (E, C).
T5m	Understand different roles within a team, and be able to exercise leadership;
T6	Use information and communications technology (E, C).
T7	Learn independently in familiar and unfamiliar situations with open-mindedness and in the spirit of critical enquiry (E).
T7m	Learn new theories, concepts, methods etc in unfamiliar situations.
	Teaching and Learning Methods
T	Project planning skills (T1 and T1m) are developed through business exercises and practical project work. Knowledge of Communication and presentation skills (T2 and T3) is imparted through communications skills lectures and practised through report writing, and giving oral presentations. Mathematical skills (T4) are developed throughout the course in lectures, problem solving exercises and analysis of practical experimental work.
	Team working skills (T5 and T5m) are developed through group project work.
	IT and communication technology skills (T6) are developed through the use of computer aided design and office software tools to produce coursework submissions.
	Throughout the course the learner is encouraged to undertake independent reading both to supplement and consolidate what is being taught / learnt and to broaden their individual knowledge and understanding of the subject (T7 and T7m).
	Assessment Strategy
	Skills T1, T6 and T1m are assessed through coursework, laboratory and project reports.
	Skill T3 is assessed through presentations.
	Skills T2 and T4 are assessed by examinations and coursework throughout the course.
	Skill T5 and T5m are assessed by group project coursework in Stages 2 and 4
	Skill T7, T7m is assessed as part of specialist modules and through integration in other activities.
	T6 is assessed.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The three year programme will be delivered by Newcastle University and Singapore Institute of Technology over nine trimesters.

The programme consists of 180 credits. One credit at SIT is equivalent to two credits at Newcastle University.

On successful completion of the programme students will receive a joint award from Newcastle University and Singapore Institute of Technology.

Students will complete a 26 weeks Integrated Work Study Programme in a company in a related industry during Trimester 3 of Year 2 and Trimester 1 of Year 3.

Year 1 aims to provide all students with a firm foundation on which to build their future studies. A substantial mathematical base is provided through EPE1110 and EPE1111, this is enhanced by mathematical techniques and practice introduced in other modules. Knowledge and understanding of fundamental engineering principles is provided through the technical modules, which also serve to broaden and enhance intellectual abilities. Practical work in the laboratory emphasises a project based approach, this, together with computing classes, develops a range of practical and transferable skills.

Year 2 builds on the work of Year 1, continuing the development of an understanding of mathematical methods at the point of application. Knowledge and understanding is increased through all modules. Project work again forms a major part of the practical work of the stage. In Year 2 all students take part in a group project (EPE2207) which develops and exercises practical and teamwork skills as well as enhancing intellectual abilities. Work on Project Management provides an understanding of the requirements of the management of engineering programmes. This work is practised and assessed as part of the group project.

Year 3 continues to enhance and expand the student's knowledge, understanding and intellectual abilities. All modules are compulsory.

All students take a module covering commercial and legal aspects of engineering to further their understanding of commercial engineering practice. A major part of Year 3 is the individual student project, which is a significant part of the training of a professional engineer. This project enables the development of intellectual ability and practical and transferable skills as well as providing a mechanism for their assessment.

Key features of the programme (including what makes the programme distinctive)

This is a three year joint programme between Newcastle University and Singapore Institute of Technology delivered in Singapore.

The quality and standards of the programmes delivered in Singapore are equivalent to similar provision delivered on campus at Newcastle University. Successful candidates will be awarded a BEng (Hons) degree by Newcastle University and Singapore Institute of Technology.

Progression from each trimester and the award of the final degree are subject to the regulations and guidelines contained in the NU-SIT Joint Programmes Regulations and Exam Conventions.

Programme regulations (link to on-line version, requires login)

NEWCASTLE UNIVERSITY PROGRAMME SPECIFICATION (ncl.ac.uk)

13 Criteria for admission

Entry qualifications

The degree programme is designed for students who hold a Diploma in Electrical Engineering or equivalent qualification from any of the Polytechnics in Singapore (IEng- and EngTech-type at FHEQ Level 4 or higher). The GPA entrance requirement onto this degree programme is 3.0 and above.

Admission is also offered to A-levels students at grades AAB (in relevant subjects including Maths) for Stage 1 admission. These students will be entering onto Stage 1.

Admissions policy/selection tools

The admissions procedure will be carried out by the Singapore Institute of Technology in collaboration with the Undergraduate Admissions team at Newcastle University and selectors within the NUIS.

Level of English Language capability

Singapore Diploma graduates, having studied in an English academic medium prior to entry, are exempted from English requirements. The selectors for the Electrical Power Engineering programme will closely monitor the English quality by various means ('O' level, diploma modules, interview, personal statement etc) to identify weaker candidates. A minimum GCE O Level at grade C6 is required. Remedial actions may be taken for these applicants. Other applicants, whose first language is not English, would be required to demonstrate achievement of IELTS 6.5 (or equivalent).

14 Support for Student Learning

The Student Services portals provides links to key services and other information and is available at:

NU: https://my.ncl.ac.uk/students/

SIT: https://students.singaporetech.edu.sg/

Induction

Students will be provided to inductions to both Singapore Institute of Technology and Newcastle University. During the first week of their first trimester new students will be given a general introduction to life as a student on the Newcastle University and Singapore Institute of Technology joint programmes and to the principal support services that will be available and to general information about their programme as described in the NU-SIT joint programmes student handbook.

New and continuing students will be given detailed programme information and a clear timetable of lectures/practicals/labs/tutorials/etc.

Services and facilities available to support students' learning including the following:

- NU-SIT Joint Programmes Student Handbook
- Nanyang Polytechnic Library, SIT Library and Newcastle University's electronic Library
- Email account and online learning facilities (e.g. Learning Management System)
- Extensive laboratories and computing facilities

Study skills support
Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Students are tutored on their approach to both group and individual projects.

Academic support
The initial point of contact for a student is with a lecturer or module leader or their tutor in the first instance. Thereafter the Degree Programme Director or the Newcastle University Director of Undergraduate Studies may be consulted and SIT. Issues relating to the programme may be raised at the Student-Staff Committee (SSC), and/or at the Joint Programmes Operations Committee (JPOC).

Pastoral support
All students are assigned a personal tutor in Singapore whose responsibility is to monitor the academic performance and overall well-being of their tutees.

NU has a senior tutor who acts as an additional point of contact for a student in the event of the allocated personal tutor's absence from the University and/or in the event of complicated issues.

In addition, Newcastle University and Singapore Institute of Technology offer a range of support services, details of which are available on the following websites:
NU: http://www.ncl.ac.uk/students/wellbeing
SIT: https://www.singaporetech.edu.sg/life-sit/student-support

Support for students with disabilities
The SIT Student Care team provides help and advice for disabled students. It provides individuals with advice about facilities, services and the accessibility of the campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies. For more information, see https://www.singaporetech.edu.sg/life-sit/student-support

Learning resources
Newcastle University's main learning resources are provided by the Robinson Library (for books, journals, online resources.

Students on this programme will have access to a wide range of computing facilities through Newcastle University's "Remote Access System" or ras.ncl.ac.uk. For more information see
https://services.ncl.ac.uk/itservice/core-services/software/ras/

Increasingly, library material is available electronically via remote access so some of Newcastle University's library holdings will be available to students in Singapore. The Singapore Institute of Technology, through facilities available at Nanyang Polytechnic, provides an extensive and advanced library facility with access to media, e-books, databases, e-journals and many other information resources such as OPAC on their library catalogues. More information can be found at: http://library.nyp.edu.sg/

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews

All modules are subject to review by questionnaires which are considered by the Joint Programmes Operations Committee. Changes to, or the introduction of new, modules are considered at the Joint Programmes Operations Committee.

Student opinion is sought at the Student-Staff Committee and/or the Joint Programmes Operations Committee. New modules and major changes to existing modules are subject to approval by the Newcastle University SAgE Faculty Learning, Teaching and Student Experience Committee and the SIT Board of Studies.

Programme reviews

The Joint Programmes Operations Committee conducts an Annual Monitoring and Review of the degree programme and reports to the SAgE Faculty Learning, Teaching and Student Experience Committee and the SIT Board of Studies. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the University Learning, Teaching and Student Experience Committee

External Examiner reports

External Examiner reports are considered by the Joint Programmes Operations Committee. The JPOC responds to these reports through Faculty Learning, Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Student-Staff Committee.

Student evaluations

All modules are subject to review by student questionnaires. Informal student evaluation is also obtained at the Student-Staff Committee, and the Joint Programmes Operations Committee. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

Mechanisms for gaining student feedback

Feedback is channelled via the Student-Staff Committee and the Joint Programmes Operations Committee.

Faculty and University Review Mechanisms

Every six years degree programmes in each subject area undergo a Newcastle University Learning and Teaching Review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. Following the review, a report is produced, which forms the basis for a decision by Newcastle University Learning, Teaching and Student

Experience Committee on whether the programmes reviewed should be re-approved for a further six year period.

A review was completed in October 2020.

Accreditation reports
The programme will seek accreditation from UK Engineering Council via the Institution of Engineering Technology (IET). It is accredited by Singapore Engineering Accreditation Board (SEAB) with SIT's M.Sc in Electrical and Electronic Engineering (EEE).

16 Regulation of assessment

Pass mark
Students will be assessed on a letter scale A-F, with each letter assigned an associated Grade Point (GP) on a 5 point scale.

A D Grade with corresponding grade point of 1.0 is a pass grade.

Course requirements
Progression from one trimester to another is subject to the NU-SIT Joint Programmes Regulations and Examination Conventions.

Students should attain at least a 2.0 Cumulative GPA (CGPA) after each trimester in order to maintain good academic standing.

After each study trimester and/or consecutive trimester, the joint Board of Examiners will track the academic standing of students with CGPA < 2.0 and issue the students with the following:

- Academic Warning – in any study trimester, CGPA < 2.0
- Academic Probation – in the next consecutive study trimester, CGPA < 2.0
- Academic Termination – in the 3rd consecutive study trimester, CGPA < 2.0

Students from AY2021/2022 cohort and onwards

Students obtaining an F grade or grade point of 0 in any module will be entitled to one re-sit/re-submission as of right.

If the failed module is a pre-requisite for a higher-level module, the student will not be able to take the higher-level module until the pre-requisite of the previous module has been met.

If the student fails the re-sit, a single re-module attempt will be offered at the next available opportunity.

Students obtaining an F grade undertaking a re-sit/re-submission attempt will have their grade point capped at 1.00 for the calculation of the CGPA.

Students obtaining a D+/D or F grade have the option to undertake a re-module attempt and the grade point will be capped at 2.00 for the calculation of the CGPA.

Students from AY2020/2021 cohort and before

Students obtaining a D+/D/F grade will have a maximum of one re-sit/re-submission and one re-module attempt, unless a successful Personal Extenuating Circumstances (PEC) application has been made.

If the failed module is a pre-requisite for a higher-level module, the student will not be able to take the higher-level module until the pre-requisite of the previous module has been met.

If the student fails the re-sit, a single re-module attempt will be offered at the next available opportunity.

Re-sit and re-module attempts will be capped at grade point 2.00 for the calculation of CGPA.

Students are permitted no more than 10 credits at each level (UK FHEQ 4, 5, 6) at Grade D/grade point 1.5 or Grade E/grade point 1.0 for modules undertaken in 2019/2020 and 2020/2021.

Degree classifications
Degree classifications are based upon the Cumulative GPA for their programme of study.

All modules contribute to the final award and all years of study contribute equally.

The Cumulative Grade Point Average is calculated as follows:

$$\frac{\sum_{X=1}^{n} [\text{Grade Point} \times \text{Credits for Module X}]}{[\text{Total Credits attempted in all trimesters}]}$$

Only letter-graded modules will be included in the computation of CGPA.

NU-SIT Joint Programmes Marking Scheme

The standard NU-SIT Joint Programmes marking scheme is:

Modules taken from AY2021/22 onwards		
Letter Grade	**Grade Point**	**Descriptor**
A+	5.00	Excellent attainment of learning outcomes
A	5.00	
A-	4.50	
B+	4.00	Very Good attainment of learning outcomes
B	3.50	
B-	3.00	
C+	2.50	Good attainment of learning outcomes
C	2.00	
D+	1.50	Adequate attainment of learning outcomes
D	1.00	
F	0.00	Failed to attain learning outcomes

Modules taken up to AY2020/21		
Letter Grade	**Grade Point**	**Descriptor**
A+	5.00	Excellent attainment of most learning outcomes
A	5.00	
A-	4.50	
B+	4.00	Good attainment of most learning outcomes
B	3.50	
B-	3.00	
C+	2.50	Satisfactory attainment of most learning outcomes
C	2.00	
D	1.50	Limited attainment of most learning
E	1.00	Inadequate attainment of most learning outcomes
F	0.00	Failure to attain most learning outcomes

Degree classifications are based upon the Cumulative GPA for their programme of study:

Degree	**CGPA Requirement**	**Final Year Project**
Honours with highest distinction	4.5 ≤ CGPA ≤ 5	Minimum GP of 4.5
Honours with distinction	4.0 ≤ CGPA < 4.5	
Honours with merit	3.5 ≤ CGPA < 4.0	
Honours	3.0 ≤ CGPA < 3.5	
Pass	2.0 ≤ CGPA < 3.0	

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by the University following recommendation from the Joint Programmes Operations Committee. The External Examiner is expected to:

i. See and approve assessment papers
ii. Moderate examination and coursework marking
iii. Attend the Board of Examiners in person
iv. Report to the University on the standards of the programme

17 In addition, information relating to the programme is provided in:

Newcastle University in Singapore website:
https://www.ncl.ac.uk/singapore/study/undergraduate/

Singapore Institute of Technology website: http://www.singaporetech.edu.sg

NU-SIT Joint Programmes Regulations and Examinations Conventions

SIT-NU Programmes Academic Guide

SIT-NU Programmes Academic Guide (Annex)

SIT Student Handbook

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided.

Annex 1

Mapping of Intended Learning Outcomes onto Curriculum/Modules

Type	Stage	Module	D	EA	P	S	T	US
Compulsory	1	EPE1101		EA1, EA1m, EA3	P2		T1, T2, T4	US1, US1m, US2, US2m, US3, US3m, US4m
Compulsory	1	EPE1102	D1, D2, D3, D4, D6	EA1, EA2, EA3, EA4	P1, P2, P4, P5, P6, P8	S1, S4, S5	T1, T2, T4	US1, US2, US3, US4m
Compulsory	1	EPE1103		EA1, EA2, EA3, EA4	P2		T1, T2, T4	US1, US2, US3,
Compulsory	1	EPE1105		EA1, EA1m, EA2, EA3, EA4	P2		T1, T2, T4, T6	US1, US1m, US2, US2m, US3, US3m,
Compulsory	1	EPE1108	D4, D6	EA1, EA2, EA2m, EA3, EA4	P1m, P4		T6	US2m, US3m,
Compulsory	1	EPE1109	D2, D4	EA1, EA1m, EA2, EA3m,	P2, P2m, P4, P5, P6, P7, P8	S1, S1m, S2, S5	T1, T1m, T2, T3, T4, T7	US1, US3, US3m, US4m
Compulsory	1	EPE1100		EA2			T4	US2, US3,
Compulsory	1	EPE1111		EA2			T4	US2, US3,
Compulsory	2	EPE2200		EA1, EA1m, EA2, EA4	P1, P2, P3m	S1	T1, T2, T4	US1, US1m, US2, US2m, US3, US3m,

Compulsory	2	EPE2201	D1	EA1, EA1m, EA2, EA4	P1, P2, P3m	S1	T1, T2, T4	US1, US1m, US2, US2m, US3, US3m,
Compulsory	2	EPE2202		EA1, EA1m, EA2, EA2m, EA3	P1, P2, P2m, P3m, P8		T1, T2	US1, US2m,
Compulsory	2	EPE2203		EA1, EA1m, EA2, EA3	P1, P2, P5		T1, T2, T4	US1, US1m, US2, US2m, US3,
Compulsory	2	EPE2205		EA1, EA2, EA3	P1, P2, P4		T1, T2, T4	US1, US2, US3,
Compulsory	2	EPE2206		EA1, EA3, EA3m, EA4	P2, P4		T1, T2, T6	US1, US2m, US3,
Compulsory	2	EPE2207	D1, D2, D3, D4, D5, D6	EA1, EA3, EA4	P1, P2, P3m, P8	S1, S2, S2m, S3, S4, S5	T1, T2, T3, T5, T5, T7	US3, US4m
Compulsory	2	EPE2208		EA1, EA1m, EA2, EA2m, EA3, EA4	P1, P2		T1, T2, T4	US1, US1m, US2, US2m, US3,
Compulsory	2	EPE2210			P3, P5, P7	S1, S1m, S2, S2m, S4, S5		US4m
Compulsory	3	EPE3200	D1m, D2m	EA1, EA2, EA2m, EA3	P4			US1, US2, US2m, US3m,
Compulsory	3	EPE3201		EA1, EA2, EA2m			T4	US1, US2, US2m, US3, US4m
Compulsory	3	EPE3202	D1, D3	EA2, EA4	P1, P1m, P2m, P4			US1, US2, US3,

Compulsory	3	EPE3203	D1, D3, D5	EA1, EA1m, EA2m, EA3, EA3m, EA4	P1m, P3, P4			US3, US4m
Compulsory	3	EPE3204	D1, D3, D5	EA1, EA1m, EA2m, EA3, EA3m, EA4	P1m, P3m, P4	S1, S3, S5		US3, US4m
Compulsory	3	EPE3206	D1, D3, D5	EA1, EA1m, EA2m, EA3, EA3m, EA4	P1m, P3m, P4	S1, S3, S5		US3, US4m
Compulsory	3	EPE3207	D2, D3, D4, D6	EA1, EA2, EA3	P1, P2, P3, P4, P5, P7, P8	S2, S3		US1, US2m, US3m,
Compulsory	2	IWS3001	D2, D3, D4, D6	EA1, EA2, EA2m, EA3	P1, P2, P3, P3m, P8	S1, S2	T1, T1m, T2, T7, T7m	US1, US2m, US3m,

Annex 2

Engineering Accreditation Board Mapping of Module Learning Outcomes to Overall Programme Learning Outcomes

EAB Student Learning Outcomes (SLO)									
a	b	c	d	e	f	g	h	i	j
●	●	●	●	●	●	●	●	●	●

1. Graduate attributes

EAB adopts the set of Graduates Attributes (GAs) published by the Washington Accord[1] as the basis of Student Learning Outcomes. These relates to the knowledge, skills and behavioural traits that the students acquired while progressing through the programme. The programme must demonstrate that by the time of graduation, the students have attained the following graduate attributes:

a) **Engineering knowledge**: Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.

b) **Problem Analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

c) **Design/development of Solution**s: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

d) **Investigation**: Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

e) **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f) **The engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g) **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.

h) **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i) **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

j) **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k) **Project Management and Finance**: Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l) **Life-long Learning**: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. Please use the following as stipulated by EAB for the mapping:

● Fully consistent (contributes to more than 75% of EAB's criterion)
◐ Partially consistent (contributes to more than 50% of EAB's criterion)
○ Weakly consistent (contributes to less than 25% of EAB's criterion)
Blank Not related to EAB's criterion

(a) Apply knowledge of mathematics, science and engineering to the solution of complex engineering problems;
(b) Design and conduct experiments, analyse, interpret data and synthesise valid conclusions;
(c) Design a system, component, or process, and synthesise solutions to achieve desired needs;
(d) Identify, formulate, research through relevant literature review, and solve engineering problems reaching substantiated conclusions;
(e) Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints;
(f) Communicate effectively;
(g) Recognize the need for, and have the ability to engage in life-long learning;
(h) Understand the impact of engineering solutions in a societal context and to be able to respond effectively to the needs for sustainable development;
(i) Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management;
(j) Understand professional, ethical and moral responsibility

2. Please use the following as stipulated by EAB for the mapping:

● Fully consistent (contributes to more than 75% of EAB's criterion)
◐ Partially consistent (contributes to more than 50% of EAB's criterion)
○ Weakly consistent (contributes to less than 25% of EAB's criterion)
Blank Not related to EAB's criterion