UK_Spec Incorporated Engineer (IEng) Standard Mapping to GA Engineering (Design and Manufacture) at GCU

Note:

Level 1 students should **use Option 1 "Module" only** and refer to and use **Tables 1.1 (for Trimester A logbook) and 1.2 only (for Trimester B).** You may use *all Level 1 modules* in Trimester A apart from Integrated Engineering Studies 1 (IES 1) module, whilst you can *only* use IES 1 module in Trimester B (please refer to Logbook Guidance video and materials for more information).

You should not use the same Competence against the same Module more than twice per trimester. For example, in Trimester A you cannot use C1 against Mathematics 1 more than twice, but you can use C1 against other modules that map to it (see Table 1.1). In Trimester B (see Table 1.2), you must use all the eight competences at least once, with one extra of your choosing in one of the nine weeks (for example, you might use C18 in week 1 and week 9, with the others listed in Table 1.2 used only once).

Level 2, 3 & 4 students should refer to Table sets A, B & C, as directed below.

If you select **Option 1 "Module" (Level 2-4 only)** then link in UK Spec Competences below – please refer to the table relevant to your stream, as below:

- **Tables A.1 & A.2** - Computer Aided Engineering (CAE) Stream
- **Tables B.1 & B.2** - Electrical Power Engineering (EPE) Stream
- **Tables C.1 & C.2** - Control & Instrumentation (C&I) Stream

If you select **Option 2 "Programme" (Levels 2-4 only)** then please refer to **Table D.1**, which applies to all streams.

Level 2, 3 & 4 students: for "Module" (Option 1), you should not use the same Competence against the same Module more than twice per trimester.

Level 2, 3 & 4 students: you can only use "Programme" (Option 2) a maximum of twice per trimester. Level 1 students cannot use this option.

Level 2, 3 & 4 students: use only Competences that align with Modules that you are studying in the given study year and Trimester. In exceptional circumstances, Trimester A modules can be used in Trimester B, but only if all Trimester B modules are not applicable.

Please refer to notes at the bottom of individual tables for other exceptions relating to Optional Modules etc.

Table 1.1 – Level 1 Students - Trimester A Logbook

	Competence	**Modules**
C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems	Mathematics 1 Engineering Science Mechanical Principles Electrical Principles
C2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	Mathematics 1 Engineering Science Mechanical Principles Electrical Principles
C3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed	Mathematics 1 Engineering Science Mechanical Principles Electrical Principles
C5	Design solutions for complex problems that meet a combination of societal, user, business and customer needs, as appropriate.	Modern Engineering Practice
C11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion	Modern Engineering Practice
C12	Use practical laboratory and workshop skills to investigate complex problems	Modern Engineering Practice Mechanical Principles Electrical Principles
C13	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations	Modern Engineering Practice
C16	Function effectively as an individual, and as a member or leader of a team	Modern Engineering Practice
C18	Plan and record self-learning and development as the foundation for lifelong learning/CPD	Modern Engineering Practice

Notes:

- Use only Competences that align with Modules that you are studying in the given study year
- Refer to the Module Descriptors for more information on a specific module: https://www.gcu.ac.uk/currentstudents/essentials/modules (searching by Module Code is best; refer to GA Handbook for Module codes)
- You may use the Modern Engineering Practice module (and hence competences C5, 11, 16 & 18) regardless of whether you are studying that module or have an exemption.

Table 1.2 – Level 1 Students - Trimester B competences to be used with Integrated Engineering Studies 1 module only

	Competence to be used with IES 1 module only
C7	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts
C8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct
C10	Adopt a holistic and proportionate approach to the mitigation of security risks
C11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion
C15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights
C16	Function effectively as an individual, and as a member or leader of a team
C17	Communicate effectively on complex engineering matters with technical and non-technical audiences
C18	Plan and record self-learning and development as the foundation for lifelong learning/CPD

Notes:

- Use only Integrated Engineering Studies 1 module in Trimester B. You may not use any of the other modules
- You must use all the above eight competences at least once, with one extra of your choosing in one of the nine weeks (for example, you might use C18 in week 1 and week 9 with the others used only once)

Table A.1 – Modules for Computer Aided Engineering (CAE) Stream **(Levels 2 and above)**

	Competence	**Trimester A Module Relevant to Workplace Application (or Programme requirement)**	**Trimester B Module Relevant to Workplace Application (or Programme requirement)**
C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems	Mathematics 2 Thermodynamics and Fluid Mechanics Engineering Design and Analysis 3 & 4 Simulation for Design & Manufacture Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Manufacture & Materials 3 Energy Conversion Technologies* Computer Aided Design 2 Renewable Energy Equipment Design# Honours Project
C2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	Mathematics 2 Thermodynamics and Fluid Mechanics Engineering Design and Analysis 3 & 4 Simulation for Design & Manufacture Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Energy Conversion Technologies* Computer Aided Design 2 Honours Project
C3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed	Mathematics 2 Thermodynamics and Fluid Mechanics Engineering Design and Analysis 3 Computer Aided Engineering Simulation for Design & Manufacture Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Energy Conversion Technologies* Computer Aided Design 2 Design Process, Assembly & Manufacture# Honours Project
C4	Select and evaluate technical literature and other sources of information to address complex problems	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Honours Project

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C5	Design solutions for complex problems that meet a combination of societal, user, business and customer needs, as appropriate.	Integrated Engineering Studies 2 & 3 Simulation for Design & Manufacture Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Design Process, Assembly & Manufacture[#] Honours Project
C6	Apply an integrated or systems approach to the solution of complex problems	Engineering Design and Analysis 3 Integrated Engineering Studies 3 Simulation for Design & Manufacture Engineering Design and Analysis 4 Honours Project	Control & Instrumentation Systems Integrated Engineering Studies 3 Engineering Design and Analysis 2 Engineering Operations Management Energy Conversion Technologies[*] Computer Aided Design 2 Renewable Energy Equipment Design[#] Design Process, Assembly & Manufacture[#] Honours Project
C7	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts	Integrated Engineering Studies 2 & 3	Integrated Engineering Studies 2 & 3 Design Process, Assembly & Manufacture[#]
C8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 1, 2 & 3 Honours Project
C9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	Honours Project	Engineering Operations Management Computer Aided Design 2 Honours Project
C10	Adopt a holistic and proportionate approach to the mitigation of security risks	Honours Project	Honours Project
C11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion	Integrated Engineering Studies 2 Integrated Engineering Studies 3	Integrated Engineering Studies 2 Integrated Engineering Studies 3

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C12	Use practical laboratory and workshop skills to investigate complex problems	Thermodynamics and Fluid Mechanics Manufacture & Materials 2 Computer Aided Engineering Engineering Design and Analysis 3 Simulation for Design & Manufacture Honours Project	Control & Instrumentation Systems Engineering Design and Analysis 2 Manufacture & Materials 3 Computer Aided Design 2 Renewable Energy Equipment Design[#] Honours Project
C13	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations	Manufacture & Materials 2 Computer Aided Engineering Simulation for Design & Manufacture Engineering Design and Analysis 4 Honours Project	Manufacture & Materials 3 Renewable Energy Equipment Design[#] Design Process, Assembly & Manufacture[#] Honours Project
C14	Discuss the role of quality management systems and continuous improvement in the context of complex problems	Simulation for Design & Manufacture	Manufacture & Materials 3 Engineering Operations Management
C15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights	Integrated Engineering Studies 2 & 3 Simulation for Design & Manufacture Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Honours Project

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C16	Function effectively as an individual, and as a member or leader of a team	Integrated Engineering Studies 2 & 3 Manufacture & Materials 2 Engineering Design and Analysis 3	Integrated Engineering Studies 2 & 3 Engineering Design and Analysis 2
C17	Communicate effectively on complex engineering matters with technical and non-technical audiences	Integrated Engineering Studies 2 & 3 Simulation for Design & Manufacture Honours Project	Integrated Engineering Studies 2 & 3 Honours Project
C18	Plan and record self-learning and development as the foundation for lifelong learning/CPD	Integrated Engineering Studies 2 & 3 Simulation for Design & Manufacture Honours Project	Integrated Engineering Studies 2 & 3 Honours Project

Notes:

- Use only Competences that align with Modules that you are studying in the given study year and Trimester. In exceptional circumstances, Trimester A modules can be used in Trimester B, but only if no Trimester B modules are not applicable.

* Energy Conversion Technologies (ECT) is strictly a Trimester C module, but Level 3 students can use in their Trimester B logbook

\# Level 4 students should choose either Renewable Energy Equipment Design (REED) or Design Process, Assembly & Manufacture (DPAM), where indicated as per their chosen option (i.e. DPAM students cannot use REED and vice versa).

Table A.2 – Competences specific to Modules across all years for the **Computer Aided Engineering (CAE) Stream**.

Note: Level 2,3 & 4 students can only use modules within their year of study and Trimester (as per Table A.1). Level 1 students may use all modules (and corresponding competences) in their year of study apart from the IES 1 module in Trimester A (as per Table 1.1) but can only use the IES 1 module in Trimester B (as per Table 1.2).

YEAR	COURSES	Level	Trimester	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
YEAR 1	Mathematics 1 (M1H326674)	1	AB	✓	✓	✓															
	Mechanical Principles (M1H326679)	1	B	✓	✓	✓									✓						
	Electrical Principles (M1H626681)	1	B	✓	✓	✓									✓						
	Modern Engineering Practice (M1H326682)	1	AB					✓						✓	✓	✓			✓		✓
	Engineering Science (M1H626688)	1	A	✓	✓	✓															
	Integrated Engineering Studies 1 (M1H130308)	1	ABC							✓	✓		✓	✓				✓	✓	✓	✓
YEAR 2	Mathematics 2 (M2H326686)	2	AB	✓	✓	✓															
	Thermodynamics & Fluid Mechanics (M2H324808)	2	A	✓	✓	✓									✓						
	Manufacture & Materials 2 (M2H726030)	2	A												✓	✓			✓		
	Integrated Engineering Studies 2 (M2H330273)	2	ABC				✓	✓		✓	✓			✓				✓	✓	✓	✓
	Control and Instrumentation Systems (M2H624806)	2	B	✓	✓	✓			✓						✓						
	Engineering Design and Analysis 2 (M2H724807)	2	B	✓	✓	✓			✓						✓				✓		
YEAR 3	Computer Aided Engineering (MHH124813)	4	A			✓									✓	✓					
	Manufacture & Materials 3 (M3H724815)	3	B	✓											✓	✓	✓				
	Engineering Design & Analysis 3 (M3H124814)	3	A	✓	✓	✓			✓						✓				✓		
	Energy Conversion Technologies (M3J923150)	3	C	✓	✓	✓			✓												
	Integrated Engineering Studies 3 (M3H624797)	3	ABC				✓	✓	✓	✓	✓			✓				✓	✓	✓	✓
	Engineering Operations Management (M3H724811)	3	B				✓	✓	✓			✓					✓	✓			
YEAR 4	Honours Project (MHH624821)	4	ABC	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓		✓		✓	✓
	Simulation for Design & Manufacture (MHH126676)	4	A	✓	✓	✓		✓	✓						✓	✓	✓	✓		✓	✓
	Engineering Design & Analysis 4 (MHH124819)	4	A	✓	✓				✓							✓					
	Computer Aided Design 2 (MHH127231)	4	B	✓	✓	✓			✓			✓			✓						
	Renewable Energy Equipment Design (MHH325992)	4	B	✓					✓						✓	✓					
	Design Process, Assembly and Manufacture (MHH325993)	4	B			✓		✓	✓	✓						✓					

Table B.1 – Modules for Electrical Power Engineering (EPE) Stream **(Levels 2 and above)**

	Competence	**Trimester A Module Relevant to Workplace Application (or Programme requirement)**	**Trimester B Module Relevant to Workplace Application (or Programme requirement)**
C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems	Mathematics 2 Thermodynamics and Fluid Mechanics Analogue and Digital Electronics Control Engineering 3 Power Electronic Systems 3 Power Systems Analysis Honours Project	Mathematics 2 Electrical Distribution Systems Control & Instrumentation Systems Electrical Machines Energy Conversion Technologies* Control Engineering 4# Power System Protection and Automation# High Voltage and Condition Assessment Honours Project
C2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	Mathematics 2 Thermodynamics and Fluid Mechanics Analogue & Digital Electronics Control Engineering 3 Power Electronic Systems 3 Power Systems Analysis Renewable Power Integration Honours Project	Mathematics 2 Electrical Distribution Systems Control & Instrumentation Systems Energy Conversion Technologies* Electrical Machines Control Engineering 4# Power System Protection and Automation# High Voltage and Condition Assessment Honours Project
C3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed	As per C2	As per C2
C4	Select and evaluate technical literature and other sources of information to address complex problems	Integrated Engineering Studies 2 & 3 Power Electronic Systems 3 Renewable Power Integration Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Electrical Machines High Voltage and Condition Assessment Honours Project

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C5	Design solutions for complex problems that meet a combination of societal, user, business and customer needs, as appropriate.	Integrated Engineering Studies 2 & 3 Renewable Power Integration Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Control Engineering 4 High Voltage and Condition Assessment Honours Project
C6	Apply an integrated or systems approach to the solution of complex problems	Engineering Design and Analysis 3 Integrated Engineering Studies 3 Control Engineering 3 Renewable Power Integration Power Systems Analysis Honours Project	Control & Instrumentation Systems Integrated Engineering Studies 3 Electrical Distribution Systems Engineering Operations Management Energy Conversion Technologies* Electrical Machines Control Engineering 4# Power System Protection and Automation# High Voltage and Condition Assessment Honours Project
C7	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts	Integrated Engineering Studies 2 & 3	Integrated Engineering Studies 2 & 3
C8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Honours Project
C9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	Renewable Power Integration Power Systems Analysis Honours Project	Engineering Operations Management Honours Project High Voltage and Condition Assessment Power System Protection and Automation#
C10	Adopt a holistic and proportionate approach to the mitigation of security risks	Honours Project	Honours Project
C11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion	Integrated Engineering Studies 2 & 3	Integrated Engineering Studies 2 & 3

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C12	Use practical laboratory and workshop skills to investigate complex problems	Thermodynamics and Fluid Mechanics Analogue & Digital Electronics Control Engineering 3 Power Electronic Systems 3 Honours Project	Control & Instrumentation Systems Electrical Distribution Systems Honours Project
C13	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations	Honours Project	Control Engineering 4# Power System Protection and Automation# Honours Project
C14	Discuss the role of quality management systems and continuous improvement in the context of complex problems		Engineering Operations Management High Voltage and Condition Assessment
C15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Honours Project
C16	Function effectively as an individual, and as a member or leader of a team	Integrated Engineering Studies 2 & 3 Power Electronic Systems 3	Integrated Engineering Studies 2 & 3
C17	Communicate effectively on complex engineering matters with technical and non-technical audiences	Integrated Engineering Studies 2 & 3 Power Systems Analysis Honours Project	Integrated Engineering Studies 2 & 3 Honours Project Power System Protection and Automation#
C18	Plan and record self-learning and development as the foundation for lifelong learning/CPD	Integrated Engineering Studies 2 & 3 Renewable Power Integration Honours Project	Integrated Engineering Studies 2 & 3 Honours Project

Notes:

- Use only Competences that align with Modules that you are studying in the given study year and Trimester. In exceptional circumstances, Trimester A modules can be used in Trimester B, but only if all Trimester B modules are not applicable.

* Energy Conversion Technologies (ECT) is strictly a Trimester C module, but Level 3 students can use in their Trimester B logbook

\# Level 4 students should choose either Control 4 or Power System Protection and Automation (PSP&A), where indicated as per their chosen option (i.e. Control 4 students cannot use PSP&A and vice versa).

Table B.2 – Competences specific to Modules across all years for the **Electrical Power Engineering (EPE) Stream**.

Note: Level 2,3 & 4 students can only use modules within their year of study and Trimester (as per Table A.1). Level 1 students may use all modules (and corresponding competences) in their year of study apart from the IES 1 module in Trimester A (as per Table 1.1) but can only use the IES 1 module in Trimester B (as per Table 1.2).

YEAR	COURSES	Level	Trimester	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
YEAR 1	Mathematics 1 (M1H326674)	1	AB	✓	✓	✓															
	Mechanical Principles (M1H326679)	1	B	✓	✓	✓									✓						
	Electrical Principles (M1H626681)	1	B	✓	✓	✓									✓						
	Modern Engineering Practice (M1H326682)	1	AB					✓						✓	✓	✓			✓		✓
	Engineering Science (M1H626688)	1	A	✓	✓	✓															
	Integrated Engineering Studies 1 (M1H130308)	1	ABC							✓	✓		✓	✓				✓	✓	✓	✓
YEAR 2	Mathematics 2 (M2H326686)	2	AB	✓	✓	✓															
	Thermodynamics & Fluid Mechanics (M2H324808)	2	A	✓	✓	✓									✓						
	Electrical Distribution Systems (M2H626266)	2	BC	✓	✓	✓			✓						✓						
	Analogue & Digital Electronics (M2H626267)	2	A	✓	✓	✓									✓						
	Integrated Engineering Studies 2 (M2H330273)	2	ABC				✓	✓		✓	✓			✓				✓	✓	✓	✓
	Control and Instrumentation Systems (M2H624806)	2	B	✓	✓	✓			✓						✓						
YEAR 3	Control Engineering 3 (M3H627229)	3	A	✓	✓	✓			✓						✓						
	Power Electronic Systems 3 (M3H623070)	3	A	✓	✓	✓	✓								✓				✓		
	Electrical Machines (M3H625943)	3	B	✓	✓	✓	✓		✓												
	Energy Conversion Technologies (M3J923150)	3	C	✓	✓	✓			✓												
	Integrated Engineering Studies 3 (M3H624797)	3	ABC				✓	✓	✓	✓	✓			✓				✓	✓	✓	✓
	Engineering Operations Management (M3H724811)	3	B				✓	✓	✓			✓					✓	✓			
YEAR 4	Honours Project (MHH624821)	4	ABC	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓		✓		✓	✓
	Power Systems Analysis (MHH630298)	4	A	✓	✓	✓			✓			✓								✓	
	Renewable Power Integration (MHH626773)	4	A		✓	✓	✓	✓	✓			✓									✓
	Power Systems Protection and Automation (MHH630295) (Option)	4	B	✓	✓	✓			✓			✓		✓		✓				✓	
	Control Engineering 4 (MHH622747) (Option)	4	B	✓	✓	✓		✓	✓							✓					
	HV and Condition Assessment (MHH625270)	4	B	✓	✓	✓	✓	✓	✓			✓					✓				

Table C.1 – Modules for Control & Instrumentation (C&I) Stream **(Levels 2 and above)**

	Competence	**Trimester A Module Relevant to Workplace Application (or Programme requirement)**	**Trimester B Module Relevant to Workplace Application (or Programme requirement)**
C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems	Mathematics 2 Thermodynamics and Fluid Mechanics Analogue & Digital Electronics# Engineering Design and Analysis 3 Control Engineering 3 Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Energy Conversion Technologies* Instrumentation Control Engineering 4 Honours Project
C2	Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	Mathematics 2 Thermodynamics and Fluid Mechanics Analogue & Digital Electronics# Engineering Design and Analysis 3 Control Engineering 3 Applied Instrumentation Systems Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Energy Conversion Technologies* Instrumentation System Health Management Control Engineering 4 Honours Project
C3	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed	Mathematics 2 Thermodynamics and Fluid Mechanics Analogue & Digital Electronics# Engineering Design and Analysis 3 Control Engineering 3 Computer Aided Engineering Applied Instrumentation Systems Honours Project	Mathematics 2 Control & Instrumentation Systems Engineering Design and Analysis 2 Energy Conversion Technologies* Instrumentation Control Engineering 4 Honours Project
C4	Select and evaluate technical literature and other sources of information to address complex problems	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Honours Project

	Competence	Trimester A Module Relevant to Workplace Application (or Programme requirement)	Trimester B Module Relevant to Workplace Application (or Programme requirement)
C5	Design solutions for complex problems that meet a combination of societal, user, business and customer needs, as appropriate.	Integrated Engineering Studies 2 & 3 Applied Instrumentation Systems Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Control Engineering 4 Honours Project
C6	Apply an integrated or systems approach to the solution of complex problems	Engineering Design and Analysis 3 Integrated Engineering Studies 3 Control Engineering 3 Applied Instrumentation Systems Honours Project	Control & Instrumentation Systems Integrated Engineering Studies 3 Engineering Design and Analysis 2 Engineering Operations Management Energy Conversion Technologies* Instrumentation System Health Management Control Engineering 4 Honours Project
C7	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts	Integrated Engineering Studies 2 & 3	Integrated Engineering Studies 2 & 3
C8	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Honours Project
C9	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	Honours Project	Engineering Operations Management Honours Project
C10	Adopt a holistic and proportionate approach to the mitigation of security risks	Honours Project	Honours Project
C11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion	Integrated Engineering Studies 2 & 3	Integrated Engineering Studies 2 & 3

C12	Use practical laboratory and workshop skills to investigate complex problems	Thermodynamics and Fluid Mechanics Manufacture & Materials 2# Analogue & Digital Electronics# Engineering Design and Analysis 3 Control Engineering 3 Computer Aided Engineering Honours Project	Mechanical Principles Electrical Principles Control & Instrumentation Systems Engineering Design and Analysis 2 Instrumentation System Health Management Honours Project
C13	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations	Manufacture & Materials 2# Computer Aided Engineering Applied Instrumentation Systems Honours Project	Manufacture & Materials 3 Control Engineering 4 Honours Project
C14	Discuss the role of quality management systems and continuous improvement in the context of complex problems		Engineering Operations Management
C15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Engineering Operations Management Honours Project
C16	Function effectively as an individual, and as a member or leader of a team	Integrated Engineering Studies 2 & 3 Manufacture & Materials 2# Engineering Design and Analysis 3	Integrated Engineering Studies 2 & 3 Engineering Design and Analysis 2 System Health Management
C17	Communicate effectively on complex engineering matters with technical and non-technical audiences	Integrated Engineering Studies 2 & 3 Applied Instrumentation Systems Honours Project	Integrated Engineering Studies 2 & 3 Honours Project
C18	Plan and record self-learning and development as the foundation for lifelong learning/CPD	Integrated Engineering Studies 2 & 3 Honours Project	Integrated Engineering Studies 2 & 3 Honours Project

Notes:

- Use only Competences that align with Modules that you are studying in the given study year and Trimester. In exceptional circumstances, Trimester A modules can be used in Trimester B, but only if no Trimester B modules are not applicable.

* Energy Conversion Technologies (ECT) is strictly a Trimester C module, but Level 3 students can use in their Trimester B logbook

\# Level 2 students should choose either Manufacture & Materials 2 (MM2) or Analogue & Digital Electronics (A&DE), where indicated as per their chosen option (i.e. MM2 students cannot use A&DE and vice versa).

Table C.2 – Competences specific to Modules across all years for the Control & Instrumentation (C&I) Stream.

Note: Level 2,3 & 4 students can only use modules within their year of study and Trimester (as per Table A.1). Level 1 students may use all modules (and corresponding competences) in their year of study apart from the IES 1 module in Trimester A (as per Table 1.1) but can only use the IES 1 module in Trimester B (as per Table 1.2).

YEAR	COURSES	Level	Trimester	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
YEAR 1	Mathematics 1 (M1H326674)	1	AB	✓	✓	✓															
	Mechanical Principles (M1H326679)	1	B	✓	✓	✓									✓						
	Electrical Principles (M1H626681)	1	B	✓	✓	✓									✓						
	Modern Engineering Practice (M1H326682)	1	AB					✓						✓	✓	✓			✓		✓
	Engineering Science (M1H626688)	1	A	✓	✓	✓															
	Integrated Engineering Studies 1 (M1H130308)	1	ABC							✓	✓		✓	✓				✓	✓	✓	✓
YEAR 2	Mathematics 2 (M2H326686)	2	AB	✓	✓	✓															
	Thermodynamics & Fluid Mechanics (M2H324808)	2	A	✓	✓	✓									✓						
	Manufacture & Materials 2 (M2H726030)	2	A												✓	✓			✓		
	Analogue & Digital Electronics (M2H626267)	2	A	✓	✓	✓									✓						
	Integrated Engineering Studies 2 (M2H330273)	2	ABC				✓	✓		✓	✓			✓				✓	✓	✓	✓
	Control and Instrumentation Systems (M2H624806)	2	B	✓	✓	✓			✓						✓						
	Engineering Design and Analysis 2 (M2H724807)	2	B	✓	✓	✓			✓						✓				✓		
YEAR 3	Control Engineering 3 (M3H627229)	3	A	✓	✓	✓			✓						✓						
	Instrumentation (M3W226254)	3	B	✓	✓	✓			✓						✓						
	Engineering Design & Analysis 3 (M3H124814)	3	A	✓	✓	✓			✓						✓				✓		
	Energy Conversion Technologies (M3J923150)	3	C	✓	✓	✓			✓												
	Integrated Engineering Studies 3 (M3H624797)	3	ABC				✓	✓	✓	✓	✓			✓				✓	✓	✓	✓
	Engineering Operations Management (M3H724811)	3	B				✓	✓	✓			✓					✓	✓			
YEAR 4	Honours Project (MHH624821)	4	ABC	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓		✓		✓	✓
	Computer Aided Engineering (MHH113285)	4	A			✓									✓	✓					
	Applied Instrumentation Systems (MHW226260)	4	A		✓	✓		✓	✓							✓				✓	
	Control Engineering 4 (MHH622747)	4	B	✓	✓	✓		✓	✓							✓					
	System Health Management (MHW226259)	4	B		✓				✓						✓				✓		

Table D.1 – BEng Engineering (Design & Manufacture) Graduate Apprenticeship Programme Aims and UK SPEC codes **(Level 2 – 4 only)**.

	Programme Aim	**UK SPEC Code**
1	To create in the student an ability to think clearly and logically	C2
2	To equip the student with a range of analytical methods for use in engineering applications	C3
3	To provide such principles and practice as will allow the student to acquire an understanding of engineering to cope adequately with technological change	C3
4	To develop the students' ability to contribute to the specification, design, testing, commissioning, modification, manufacture and maintenance of engineering artefacts and systems both generally and within the context of an employer's business	C5
5	To develop fully the student's abilities in the use of computer aided engineering and relevant aspects of information technology	C3
6	To make the student aware of the ethics, social, economic, and environmental impact of engineering	C8
7	To extend, enhance and improve the judgement of the student in decision making by extension of analytical, creative and intellectual skills	C2
8	To integrate the expertise of staff gained from research, consultancy and scholarly activity into the programme materials where appropriate	C5
9*	To develop the students' interpersonal skills to enable effective communication and team working and operate within project management roles	Communication (C17) Teamworking (C16)
10	To provide a broad education by an integrated study of vocational and academic disciplines	C6
11	To integrate the programme with the student's developing experiential learning and training as part of an apprenticeship with their employer	C6
12	To integrate a Work-Based Learning culture to deepen and broaden the academic understanding within the context of employer focussed activities	C6

Notes:

Choose only one Programme Aim and UK SPEC Code

Only use Programme Aims a maximum of twice per trimester

* For Programme Aim #9, choose only one UK SPEC code (choose the one you feel is most appropriate between Communication and Teamworking)

Note: Level 1 students cannot use Programme Aims