Course Specification

Course Summary Information				
1	**Course Titles**		BEng (Hons) Mechanical Engineering BEng (Hons) Mechanical Engineering with Professional Placement Year MEng Mechanical Engineering MEng Mechanical Engineering with Professional Placement Year	
2	**BCU Course Codes**	**UCAS Codes**	BEng (Hons) US0665 MEng UM0030	H300 H301
3	**Awarding Institution**		Birmingham City University	
4	**Teaching Institution(s)** (if different from point 3)			
5	**Professional Statutory or Regulatory Body (PSRB) accreditation** (if applicable)		The Institution of Engineering and Technology (IET)	

6	**Course Description**
	Our BEng (Hons) Mechanical Engineering will develop you as a skilled engineer capable of undertaking mechanical engineering tasks within and across organisations. The course focuses on the importance of sustainable futures and the Government's STEM agenda, to give you the knowledge and attributes you will need to thrive in this ever-changing industry. You will work on industry-standard analytical tools, develop your design skills, as well as exploring a wide range of facilities, such as Engineering Science and Industry 4.0 laboratories and, industry standard Selective Laser Melting equipment (metal 3D printer). **What's covered in the course?** Our engineering courses focus on project-based activities, giving you lots of opportunity to work in teams on projects from design to implementation. This will give you practical experience of applying engineering science to real world problems, working in multidisciplinary teams to develop your interpersonal skills, and prepare you for a key aspect of modern engineering practice. Problem-solving and project management are key skills for an engineer, and our focus on practical experience will help to improve your skills in these highly sought-after areas. During your studies, you will use the latest tools and technologies, developing new skills at an advanced level. The course will encourage your creative thinking and develop your engineering leadership skills. Building on a foundation of the generic skills required by tomorrow's engineers, you will also explore the wider context of engineering, as well as the application of advanced engineering principles to solve problems through research and development. You'll engage in independent study and systematic enquiry at an advanced level and take responsibility for the conclusions drawn from it. You will have lots of opportunity to apply industry-standard modelling and simulation techniques to the analysis, specification and design of mechanical engineering systems so that you are

able to apply your knowledge and theory to a practical situation. In this way, we make sure you are ready to step straight into employment.

Specifically, this course will develop your skills in the key areas of:

- Mechanical technology including design, mechanical methodologies, methods, techniques and current / developing theories and conceptual ideas.
- Mechanical engineering science and applied mathematics.
- Management, including current management techniques and theories, risk management, supplier relations and financial controls.
- Digital Technology, which will include developing your skills in the areas of CAD, CAM, analytical software, Internet enabled packages and general IT skills.
- Communication and interpersonal skills, including written, verbal and new media presentation skills as well as working with others.
- The role of engineers in creating a sustainable and ethical environment.

These skills are critical for developing modern technology and are highly sought after by engineering organisations such as Rolls Royce and Bombardier, who need skilled employees to successfully compete in the global marketplace.

Course aims

The content and structure of the Mechanical Engineering course are designed to provide you with an academically challenging and vocationally relevant degree, which encompasses all aspects of successfully entering and progressing your career within Mechanical Engineering. Furthermore, the course has clearly identifiable core themes, with significant elements of practice-based learning.

The course aims to:

- Provide you with the appropriate intellectual tools to be able to operate effectively as an engineer, within the multidisciplinary environment of an engineering-based company.
- Develop your awareness of the relationship between theory and practice and the ability to adapt your approach to solve complex technical problems quickly and competently with known technology and to design creatively a product, process or system to meet a defined need.
- Provide appropriate practical engineering opportunities, combining theory and experience, to enable you to become engineers with awareness, knowledge, skills, and an understanding of a range of experience of engineering practice.
- Extend your confidence and professionalism in high-level communication tools and to develop interpersonal and team working skills to be able to contribute effectively to business activities.
- Develop your ability to reflect on and evaluate their learning and technical achievements and performance to clearly identify their proposed professional intent.
- Provide an accessible and flexible course suitable for you from a wide range of backgrounds to succeed and progress.
- Enable you to develop critical evaluation skills and apply appropriate engineering solutions.
- Enable you to fulfil the role of a competent engineer by being able to tackle engineering needs and problems associated with systems, processes and components and implement appropriate solutions.
- Support you in becoming an engineer who possesses appropriate awareness, knowledge and understanding of the economic, social and environmental context of industrial technology within the mechanical engineering area.

	In addition, you will: • Develop knowledge, understanding and skills in stress analysis, thermodynamics, design and management, relevant to industry needs and recognised for delivering value driven solutions. • Focus on the application of industry-standard design, modelling and simulation techniques to support the analysis, specification and implementation of mechanical engineering systems. • Demonstrate the ability to understand the importance of developing a range of skills associated with cooperation and collaboration when working across disciplines. • Undertake group work and project-based challenges that enable you to compete for a variety of employment opportunities within the mechanical engineering and associated industries. • Demonstrate a consideration of the wider aspects and global impact of your discipline and an ability to contribute to the engineering sector in different international contexts. **Progression to MEng Mechanical Engineering** This course offers the option to progress to the MEng Mechanical Engineering. This allows you to undertake an additional year of study at postgraduate level, following successful completion of your BEng course. If you choose to progress to an MEng, you will be able to apply to transfer during your second year of study. At this level, you are expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, ability to collect data and undertake engineering analysis to solve complex issues, and the ability to generate innovate and sustainable designs.

7	**Course Awards**		
7a	**Possible Final Awards for the Mechanical Engineering Course**	**Level**	**Credits Awarded**
	For BEng (Hons): Bachelor of Engineering with Honours Mechanical Engineering Bachelor of Engineering with Honours Mechanical Engineering with Professional Placement Year **For MEng:** Integrated Masters of Engineering Mechanical Engineering Integrated Masters of Engineering Mechanical Engineering with Professional Placement Year Level 6 Top-Up	 6 6 7 7 6	 360 480 480 600 120
7b	**Exit Awards and Credits Awarded**		
	Certificate of Higher Education Mechanical Engineering Diploma of Higher Education Mechanical Engineering Bachelor of Engineering Mechanical Engineering	4 5 6	120 240 300

8	Derogations from the University Regulations
	1. A maximum volume of 30 credits per course in a Bachelor's or Integrated Master's degree can be compensated, except that any compensation of Level 3 modules is not included in that limit. 2. A maximum volume of 20 credits per course in a Master's degree (other than an integrated Master's degree) can be compensated. 3. No condonement of modules at Levels 4-7 is permitted. 4. Where appropriate, a stage mean of at least 50% is required for students to progress from Bachelor's level (Level 6) on to the final stage of an Integrated Master's degree (Level 7), or to transfer course from a relevant Bachelor's degree to an Integrated Master's degree.

9	Delivery Patterns		
Mode(s) of Study	**Location**	**Duration of Study**	**Code**
BEng (Hons) Full Time	City Centre	3 years	US0665
BEng (Hons) Full Time with Professional Placement	City Centre	4 years	US1132
BEng (Hons) Part Time	City Centre	5 years	US0666
MEng Full Time	City Centre	4 years	UM0030
MEng Full Time with Professional Placement	City Centre	5 years	UM0076
MEng Full Time with Foundation and Professional Placement Year	City Centre	6 years	UM0078
BEng (Hons) Full Time	BCU UAE	3 years	US1436
Level 6 Top-Up	BCU UAE	1 year	US1180

10	Entry Requirements
	The admission requirements for this course are stated on the course page of the BCU website at https://www.bcu.ac.uk/ or may be found by searching for the course entry profile located on the UCAS website.

11	Course Learning Outcomes
The following table shows how the UK SPEC Learning Outcomes mapped against the 5 University's Key Themes.	

UK SPEC Learning Outcomes		Pursuing Excellence	Practice Led Knowledge Applied	Interdisciplinary	Employability Driven	Internationalisation
	A. Knowledge and understanding					
A1	Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology in the field of Mechanical Engineering	☒	☒	☐	☒	☒
A2	Engage in the creative and innovative development of mechanical engineering technology and continuous improvement systems.	☒	☒	☒	☒	☐
	B. Design and Development of processes, systems, services and products					
B1	Identify potential projects and opportunities.	☒	☒	☒	☒	☐
B2	Conduct appropriate research and undertake design and development of engineering solutions within the design and development field.	☒	☒	☒	☒	☐
B3	Manage implementation of design solutions and evaluate their effectiveness.	☒	☒	☒	☒	☐
	C. Responsibility, management and leadership					
C1	Plan for effective project implementation.	☒	☒	☒	☒	☒
C2	Plan, budget, organise, direct and control tasks, people and resources.	☒	☒	☒	☒	☒
C3	Lead teams and develop staff to meet changing technical and managerial needs.	☒	☒	☒	☒	☒
C4	Bring about continuous improvement through quality management.	☒	☒	☒	☒	☒
	D. Communication and interpersonal skills					
D1	Communicate in English with others at all levels.	☒	☒	☐	☒	☐
D2	Present and discuss proposals.	☒	☒	☐	☒	☐
D3	Demonstrate personal and social skills.	☒	☒	☐	☒	☐
	E. Professional Commitment					
E1	Comply with relevant codes of conduct.	☒	☒	☒	☒	☒
E2	Manage and apply safe systems of work.	☒	☒	☒	☒	☐
E3	Undertake engineering activities in a way that contributes to sustainable development.	☒	☒	☒	☒	☒
E4	Carry out and record CPD necessary to maintain and enhance competence in own area of practice	☒	☒	☐	☒	☐
E5	Exercise responsibilities in an ethical manner.	☒	☒	☒	☒	☒

The Course learning outcomes are articulated per each level in terms of:

- Knowledge and understanding
- Intellectual skills
- Practical/subject specific skills
- Transferable skills.

At Level 4, you will illustrate your succession from familiarity and working understanding to a wider appreciation, application and deeper understanding at Level 5. At Level 6, you will illustrate your ability to independently apply knowledge, skills and understanding, with a focus on active and reflective practice and clear evidence of synthesis and integration of the various skills and knowledge acquired throughout the course. The Level 6 learning outcomes are designed for you to propose and carry out individual study courses in design and research that fully explore your analytical, creative and innovative problem-solving potential. Your achievement of learning outcomes is an incremental and progressive by its nature as your advance through course of study, hence only Level 6 learning outcomes are listed below, demonstrating a threshold level of performance expected of all Honours graduates. At Level 7, a higher appreciation is required especially regarding leadership and teamwork. At this level, you are expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, an ability to collect data and undertake engineering analysis to solve complex issues, be able to generate innovate and sustainable designs and have higher generic skills.

Appendix 1 shows the precise Level 4, 5, 6 and 7 modules alignment with the learning outcomes that are to be considered in terms of the overall progression through all levels of study.

Knowledge and understanding:

Level 4
On successful completion of the course, you must be able to demonstrate:

- Appropriate mathematical techniques, including algebra, trigonometry, calculus, statistics and probability.
- The principle of mechanical engineering and their application in simple engineering science
- Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems.
- Safe working practices, risk assessment.

Level 5
On successful completion of the course, you must be able to demonstrate:

- In depth Knowledge and understanding of essential facts, concepts, theories and principles of mechanical engineering, and its underpinning science and mathematics.
- Appreciation of the wider multidisciplinary engineering context and its underlying principles.
- In depth Knowledge of the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.
- Computer-based design and modelling include its applications.

Level 6
On successful completion of the course, you must be able to demonstrate:

- Project management, business management, environmental issue and ethics as applied to professional engineering.
- Selection, critical evaluation, implementation and presentation of an engineering project.

- Design methodology appropriate to mechanical engineering.
- Critical analysis and problem solving of a mechanical based project.

Level 7
On successful completion of the course, you must be able to demonstrate:
- The scientific principles of Mechanical Engineering to an advanced level.
- Further mathematical and computer models relevant to the Mechanical engineer to a comprehensive level and an appreciation of their limitations.
- Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.

Intellectual Abilities:

Level 4
On successful completion of the course, you must be able to:
- Apply appropriate quantitative science and engineering tools to the analysis of problems.
- Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.
- Comprehend the broad picture and thus work with an appropriate level of detail.
- Investigate simple mechanical problem with appropriate mathematical methods.

Level 5
On successful completion of the course, you must be able to:
- Analyse and use appropriate advanced mechanical engineering principles to solve wide range of problems.
- Use of Computer Aided Design and engineering analysis tools.
- Identify and evaluate relevant practices within an appropriate professional and ethical framework.
- Evaluate and apply mechanical problem solving that can assist in the engineering process.

Level 6
On successful completion of the course, you must be able to:
- Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques.
- Identify and critically evaluate relevant practices within an appropriate professional and ethical framework.
- Ability to analyse, evaluate and recommend design solutions to meet client's requirements.
- Identify the constraint of an engineering project.

Level 7
On successful completion of the course, you must be able to:
- Use fundamental knowledge to investigate new technologies.
- Apply advanced mathematical and computer-based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.
- Extract data pertinent to an unfamiliar problem, and effect solutions using computer-based engineering tools when appropriate.

- Debate contemporary issues in Mechanical Engineering.
- Critically discuss the importance of Mechanical Engineering on a global scale.

Practical / Subject Specific skills:

Level 4
On successful completion of the course, you must be able to:

- Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control.
- Provide evidence of group working and of participation in projects.
- Apply safe working procedures, health &safety legislation, risk assessment and risk management techniques.
- Communicate effectively by written, visual and oral means.

Level 5
On successful completion of the course, you must be able to:

- Apply safe working practices to the mechanical engineering-based laboratory work.
- Use a Computer Aided Design package in a design process.
- Interpret written and design information for areas of more complex work.

Level 6
On successful completion of the course, you must be able to:

- Apply project planning techniques and scheduling methods.
- Identify and critically evaluate the tasks required to complete a mechanical project/product in conjunction with a customer's needs.
- Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology.
- Able to summarise, accurately, the arguments presented in a range of complex works within and about mechanical engineering specific subject.

Level 7
On successful completion of the course, you must be able to:

- Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.
- Generate ground-breaking designs for products, systems, or components.
- Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.

General transferable skills:

On successful completion of the course, you must be able to:

- Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.
- Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].
- Communicate effectively with other people using oral, written and graphic means.
- Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques.

- Have ability and competence in a range of skills on the current CAD and IT equipment in an effective and productive manner.
- Show initiative, work independently and able to work as member of a team to develop collaborative skills.
- Display resourceful solutions including use of advanced engineering tools to the limitations of current Mechanical Engineering practice and discuss them in a major technical report.

12 Course Requirements

12a Level 4:

To complete this course, you must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG4091	Engineering Principles 1	20
ENG4093	Engineering Practice	20
ENG4124	Mathematical Modelling 1	20
ENG4094	Engineering Principles 2	20
ENG4125	Mathematical Modelling 2	20
ENG4096	Integrated Engineering Project	20

Level 5:

To complete this course, you must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG5098	Thermodynamics and Fluid Mechanics	20
ENG5100	Design and Materials	20
ENG5099	Numerical Analysis	20
ENG5097	Leading Engineering Endeavours	20
ENG5102	Mechanical Science	20
ENG5101	Design and Manufacture	20

Professional Placement Year (optional)

To qualify for the award of Bachelor of Engineering with Honours Mechanical Engineering with Professional Placement Year or Integrated Master of Engineering Mechanical Engineering with Professional Placement Year, you must successfully complete all the modules listed as well as the following Level 5 module:

Module Code	Module Name	Credit Value
PPY5004	Professional Placement	120

Level 6:
To complete this course, you must successfully complete all the following CORE modules (totalling 120 credits):

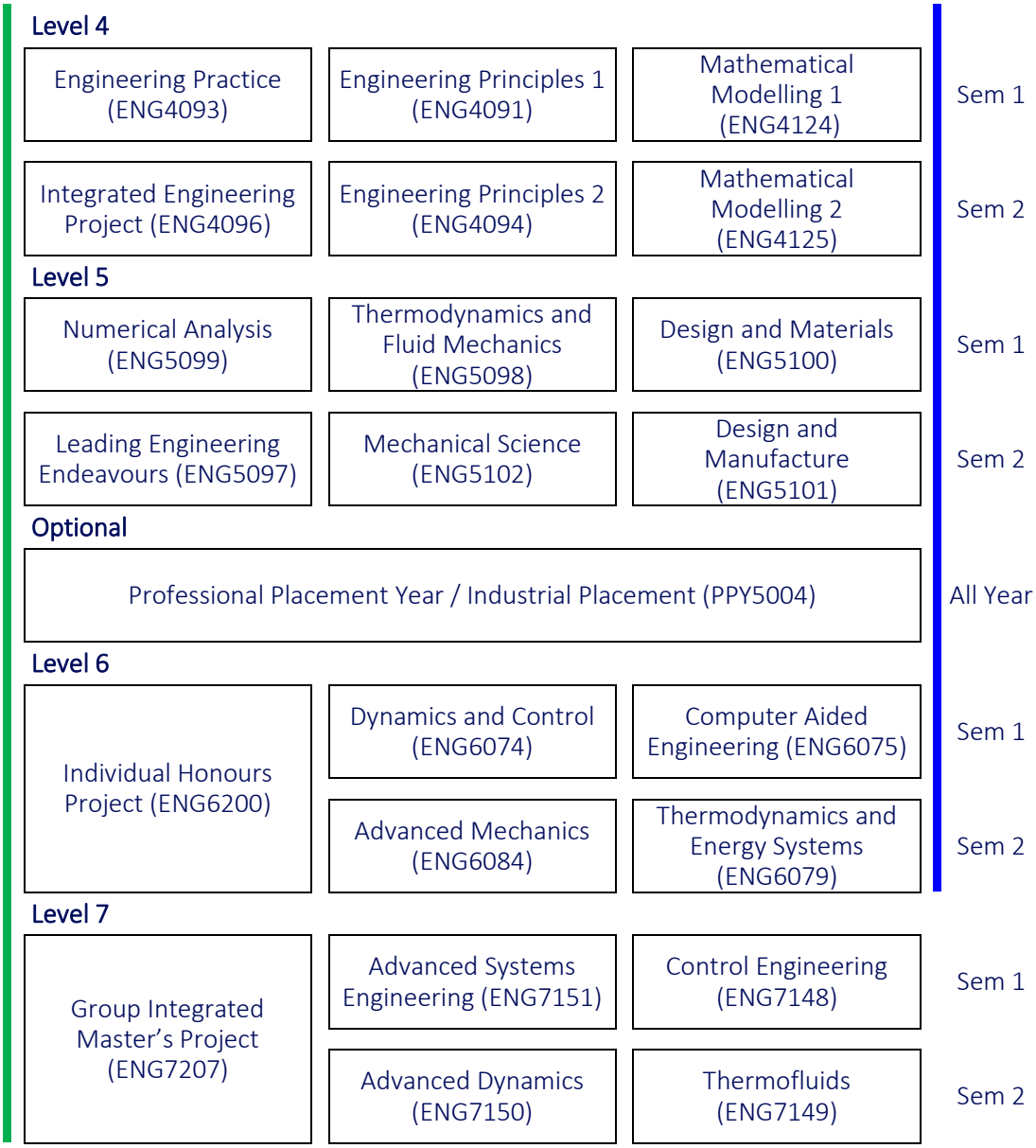
Module Code	Module Name	Credit Value
ENG6075	Computer Aided Engineering	20
ENG6074	Dynamics and Control	20
ENG6084	Advanced Mechanics	20
ENG6079	Thermodynamics and Energy Systems	20
ENG6200	Individual Honours Project	40

Level 7:
To complete this course, you must successfully complete all the following CORE modules (totalling 120 credits):

Module Code	Module Name	Credit Value
ENG7207	Group Integrated Master's Project	40
ENG7151	Advanced Systems Engineering	20
ENG7148	Control Engineering	20
ENG7150	Advanced Dynamics	20
ENG7149	Thermofluids	20

12b Structure Diagram

Course Module Grid Full-Time Mechanical Engineering



Course Routes:

---------- BEng (Hons) Mechanical Engineering

---------- MEng Mechanical Engineering Route

Part-Time Delivery – Mechanical Engineering

Year 1		
Engineering Principles 1 (ENG4091)	Mathematical Modelling 1 (ENG4124)	Sem 1
Engineering Principles 2 (ENG4094)		Sem 2
Year 2		
Engineering Practice (ENG4093)		Sem 1
Integrated Engineering Project (ENG4096)	Mathematical Modelling 2 (ENG4125)	Sem 2
Year 3		
Numerical Analysis (ENG5099)	Thermodynamics and Fluid Mechanics (ENG5098)	Sem 1
Mechanical Science (ENG5102)	Leading Engineering Endeavour (ENG5097)	Sem 2
Year 4		
Computer Aided Engineering (ENG6075)	Design and Materials (ENG5100)	Sem 1
Advanced Mechanics (ENG6084)	Design and Manufacture (ENG5101)	Sem 2
Year 5		
Individual Honours Project (ENG6200)	Dynamics and Control (ENG6074)	Sem 1
	Thermodynamics and Energy Systems (ENG6079)	Sem 2

Top-Up Part-Time Delivery – Mechanical Engineering

Partner Colleges and Others

Year 1 – Year 3

Accreditation of Prior Learning (APL)

Examples
(HND; Foundation Degree, etc. in Mechanical Engineering)

Year 4

Computer Aided Engineering (ENG6075)	Dynamics and Control (ENG6074)	Sem 1
Advanced Mechanics (ENG6084)	Thermodynamics and Energy Systems (ENG6079)	Sem 2

Year 5

Individual Honours Project (ENG6200)		Sem 1 Sem 2

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Top-Up Part-Time Delivery – Mechanical Engineering

(Partner Colleges with specific foundation degree)

Year 1 – Year 3

APL - FdEng Mechanical Engineering with Manufacture

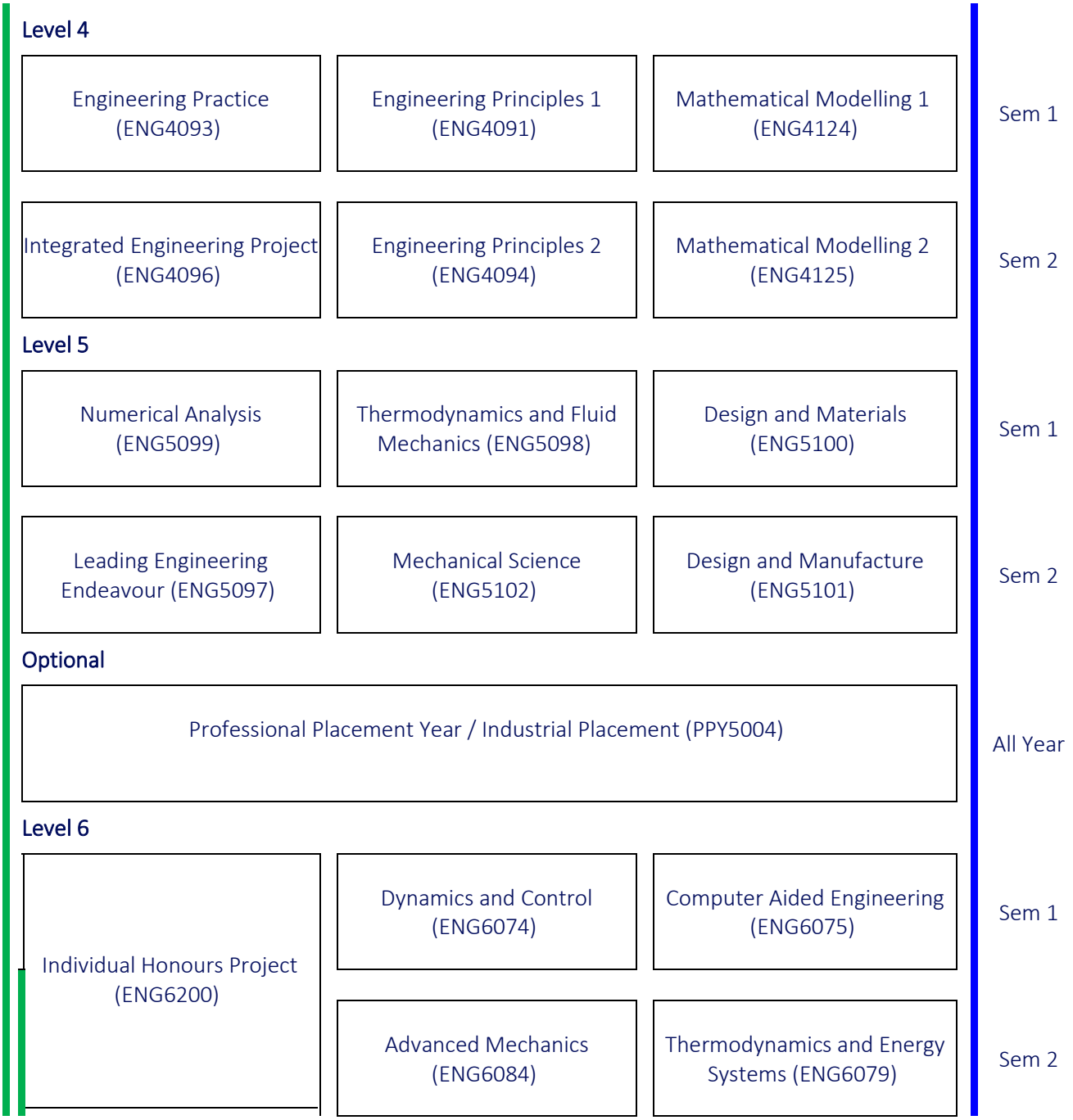
Year 4

Computer Aided Engineering (ENG6075)	Numerical Analysis (ENG5099)	Sem 1
Advanced Mechanics (ENG6084)	Mechanical Science (ENG5102)	Sem 2

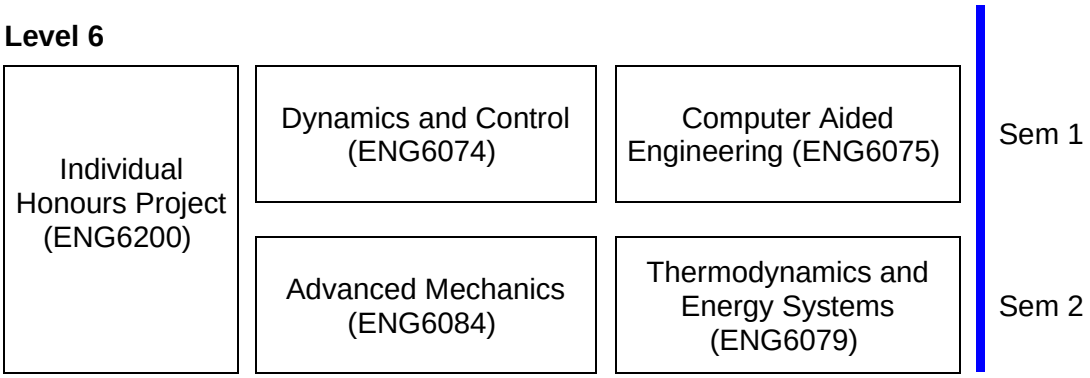
Year 5

Individual Honours Project (ENG6200)	Dynamics and Control (ENG6074)	Sem 1
	Thermodynamics and Energy Systems (ENG6079)	Sem 2

UAE Full Time Delivery



UAE Level 6 Top-Up



13 Overall Student Workload and Balance of Assessment

Overall student *workload* consists of class contact hours, independent learning and assessment activity, with each credit taken equating to a total study time of around 10 hours. While actual contact hours may depend on the optional modules selected, the following information gives an indication of how much time students will need to allocate to different activities at each level of the course.

- *Scheduled Learning* includes lectures, practical classes and workshops, contact time specified in timetable
- *Directed Learning* includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning
- *Private Study* includes preparation for exams

The *balance of assessment* by mode of assessment (e.g. coursework, exam and in-person) depends to some extent on the optional modules chosen by students. The approximate percentage of the course assessed by coursework, exam and in-person is shown below.

Level 4

Workload

44% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	528
Directed Learning	336
Private Study	336
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	40%
Exam	48%
In-Person	12%

Level 5

Workload

24% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	288
Directed Learning	192
Private Study	720
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	60%
Exam	35%
In-Person	5%

Level 6

Workload

19% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	232
Directed Learning	184
Private Study	744
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	31%
Exam	69%
In-Person	0%

Level 7

Workload

13% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	156
Directed Learning	54
Private Study	990
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Coursework	16%
Exam	80%
In-Person	4%

Appendix 1

Curriculum Mapping

Course Learning Outcomes Vs Specific Modules

LEVEL 4 General Learning Outcome	Engineering Principles 1	Mathematical Modelling 1	Engineering Practice	Engineering Principles 2	Mathematical Modelling 2	Integrated Engineering project
Knowledge and Understanding						
The principle of mechanical engineering and their application in simple engineering science	✓		✓	✓		✓
Apply and use appropriate mathematical techniques, including algebra, trigonometry, calculus and probability.		✓			✓	
Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems.	✓		✓	✓		✓
Safe working practices, risk assessment			✓			✓
Intellectual Abilities						
Apply appropriate quantitative science and engineering tools to the analysis of problems.	✓	✓		✓	✓	
Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs			✓			✓
Comprehend the broad picture and thus work with an appropriate level of detail.		✓			✓	✓
Investigate simple mechanical problem with appropriate mathematical methods.		✓	✓		✓	✓
Practical / Subject Specific skills						
Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control.		✓				✓
Provide evidence of group working and of participation in a major project is expected. However, individual professional bodies may require particular approaches to this requirement.		✓				✓
Apply safe working procedures, health &safety legislation, risk assessment and risk management techniques.		✓				✓
Communicate effectively by written, visual and oral means	✓	✓	✓	✓	✓	✓

LEVEL 4 General Learning Outcome	Engineering Principles 1	Mathematical Modelling 1	Engineering Practice	Engineering Principles 2	Mathematical Modelling 2	Integrated Engineering project
General transferable skills						
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.		✓	✓		✓	✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].			✓			✓
Communicate effectively with other people using oral, written and graphic means			✓			✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques			✓			✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.			✓		✓	✓
Show initiative, work independently and able to work as member of a team to develop collaborative skills		✓	✓			✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Mechanical Engineering practice and discuss them in a major technical report.	✓			✓		

LEVEL 5 General Learning Outcome	Thermodynamics and Fluid Mechanics	Numerical Analysis	Design and Material	Mechanical Science	Leading Engineering Endeavours	Design and Manufacture
Knowledge and Understanding						
In depth Knowledge and understanding of essential facts, concepts, theories and principles of your engineering discipline, and its underpinning science and mathematics.	✓	✓		✓		
Appreciation of the wider multidisciplinary engineering context and its underlying principles.					✓	
In depth Knowledge of the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement			✓		✓	
Computer-Based Design and modelling include its applications.		✓	✓			✓
Intellectual Abilities						
Analyse and use appropriate advanced mechanical engineering principles to solve wide range of problems	✓			✓		
Use of Computer Aided Design and engineering analysis tools		✓	✓			✓
Identify, evaluate and apply relevant practices within an appropriate professional and ethical framework			✓		✓	
Evaluate and apply mechanical problem solving that can assist in the engineering process	✓		✓	✓		✓

LEVEL 5 General Learning Outcome	Thermodynamics and Fluid Mechanics	Numerical Analysis	Design and Material	Mechanical Science	Leading Engineering Endeavours	Design and Manufacture
Practical / Subject Specific skills						
Apply safe test to the mechanical based laboratory task.			✓			✓
Use a Computer Aided Design package in a design process			✓			✓
Interpret written and design information for areas of more complex work			✓	✓		✓
General transferable skills						
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓	✓	✓	✓	✓	✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].			✓		✓	✓
Communicate effectively with other people using oral, written and graphic means			✓		✓	✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques						✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.		✓	✓			✓
Show initiative, work independently and able to work as member of a team to develop collaborative skills			✓		✓	✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Mechanical Engineering practice and discuss them in a major technical report.	✓					✓

LEVEL 6 General Learning Outcome	Dynamics and Control	Computer Aided Engineering	Advanced Mechanics	Thermodynamics and Energy Systems	Undergraduate Individual Honours Project
Knowledge and Understanding					
Project management, business management, environmental issue and ethics as applied to professional engineering.				✓	✓
Selection, critical evaluation, implementation and presentation of an engineering project		✓			✓
Design methodology appropriate to mechanical engineering	✓		✓		
Critical analysis and problem solving of a mechanical based project					✓
Intellectual Abilities					
Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques					✓
Identify and critically evaluate relevant practices within an appropriate professional and ethical framework				✓	✓
Ability to critically analyse, evaluate and recommend design solutions to meet client's requirements	✓		✓		
Identify and critically evaluate the constraint of an engineering project					✓

LEVEL 6 General Learning Outcome	Dynamics and Control	Computer Aided Engineering	Advanced Mechanics	Thermodynamics and Energy Systems	Undergraduate Individual Honours Project
Practical / Subject Specific skills					
Apply project planning techniques and scheduling methods					✓
Identify and critically evaluate the tasks required to complete a mechanical project/product in conjunction with a customers' needs					✓
Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology		✓			✓
Evaluate and critically summarise accurately the arguments presented in a range of complex works within and about mechanical engineering specific subject.	✓			✓	
General transferable skills					
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓			✓	✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].					✓
Communicate effectively with other people using oral, written and graphic means					✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques		✓		✓	✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.	✓	✓			
Show initiative, work independently and able to work as member of a team to develop collaborative skills					✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Mechanical Engineering practice and discuss them in a major technical report.					✓

LEVEL 7 General Learning Outcome	Control Engineering	Advanced Systems Engineering	Advanced Dynamics	Thermofluids	Group Integrated Masters Project
Knowledge and Understanding					
The scientific principles of Mechanical Engineering to an advanced level.	✓	✓	✓	✓	✓
Further mathematical and computer models relevant to the Mechanical engineer to a comprehensive level and an appreciation of their limitations.	✓	✓		✓	
Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.					✓
Design methodology appropriate to mechanical engineering	✓		✓		
Intellectual Abilities					
Use fundamental knowledge to investigate new technologies.	✓	✓			
Apply advanced mathematical and computer-based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.	✓		✓	✓	
Extract data pertinent to an unfamiliar problem, and effect solutions using computer-based engineering tools when appropriate.					✓
Debate contemporary issues in Mechanical Engineering					✓
Critically discuss the importance of Mechanical Engineering on a global scale		✓			

LEVEL 7 General Learning Outcome	Control Engineering	Advanced Systems Engineering	Advanced Dynamics	Thermofluids	Group Integrated Masters Project
Practical / Subject Specific skills					
Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.	✓	✓	✓		
Generate ground-breaking designs for products, systems, or components	✓			✓	
Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.					✓
General transferable skills					
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓	✓	✓	✓	
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].					✓
Communicate effectively with other people using oral, written and graphic means		✓			✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques					✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.	✓			✓	
Show initiative, work independently and able to work as member of a team to develop collaborative skills					✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Mechanical Engineering practice and discuss them in a major technical report.	✓	✓	✓	✓	