

University of Plymouth

Faculty of Science and Engineering

School of Engineering, Computing and Mathematics

Programme Specification

MEng (Hons) Mechanical Engineering (3383)

September 2022

1. **MEng (Hons) Mechanical Engineering (ME)**

Final award title(s): MEng (Hons) Mechanical Engineering

MEng (Hons) Mechanical Engineering with Composites

Level 4 Intermediate award title: Certificate of Higher Education (Cert. HE)

Level 5 Intermediate award title: Diploma of Higher Education (Dip. HE)

Level 6 Intermediate award title(s) : BEng (Hons) Mechanical Engineering

BEng (Hons) Mechanical Engineering with Composites

UCAS code: H304

HECOS code : ME : 100190 **MEC:** 100190 / 101217

2. **Awarding Institution:** University of Plymouth

Teaching institution(s): University of Plymouth

3. **Accrediting bodies**

The Institution of Mechanical Engineers (IMechE) – ME and MEC

The Institute of Materials, Minerals and Mining (IOM³) – MEC only

This degree is accredited as fully satisfying the educational requirements for Chartered Engineer (CEng) status.

Date of re-accreditation: 2021/22. Programme accredited for intakes 2017-2021.

4. **Distinctive Features of the Programme and the Student Experience**

These integrated MEng awards follow the Engineering Council's definition of awards which meet the educational requirements for progression to Chartered Engineer status. Compared to the 3-year BEng award, the MEng degree "...provide[s] a greater range and depth of specialist knowledge, within a research and industrial environment, as well as a broader and more general educational base, to provide both a foundation for leadership, and a wider appreciation of the economic, social and environmental context of engineering."¹

These awards prepare graduates for a wide range of mechanical engineering employment opportunities by allowing them to acquire competence in their technical skills, organisational ability and communication. The awards have been the standard mechanical engineering qualification for many years at the University of Plymouth. In particular, the MEng Mechanical Engineering with Composites programme was highly commended during accreditation by the Institute of Materials, Minerals and Mining (IOM³) and is unique in the UK at the undergraduate master's level. The mechanical engineering programme produces skilled, competent and highly employable graduates suitable to a diverse range of industries, including the

¹ <http://www.engc.org.uk/ecukdocuments/internet/document%20library/AHEP%20Brochure.pdf>

automotive, the aerospace as well as other mechanical engineering, sectors. The awards are actively supported by an Industrial Advisory Board of regional and many national employers – members are involved in project presentations, industry visits and work placements. A BEng ‘intermediate’ award is available for students who choose to withdraw from the MEng programme and seek earlier employment opportunities.

This programme has 2 distinct exit awards: **Mechanical Engineering (ME)** and **Mechanical Engineering with Composites (MEC)**. Award differentiation is achieved mainly through subject-specific modules embedded in the structure of the programme, in Stages 4 and 5. Stages 1 and 2 are common to both pathways, and students may transfer to the alternative pathway usually before starting stage 4. Much of the two programmes are common and designed primarily to broaden the students’ appreciation of the interdisciplinary nature of professional engineering. This satisfies the educational requirements for Chartered Engineer status. However, students also have the opportunity to undertake further discipline broadening studies, at an advanced level, in stage 5 within the core modules, and through the choice of an elective module in medical engineering & biomechanical systems, robotics or marine renewable energy.

The overarching programme teaching and learning scheme has been developed in line with the University Education and Student Experience strategy to ensure a positive student journey. The student experience will include the following distinctive features;

- Mechanical engineering graduates will be able to demonstrate in-depth knowledge of the core engineering disciplines, including design, manufacturing, structural integrity and failure of materials, thermo-fluids applications, control and intelligent system design.
- They will have gained effective knowledge and experience of the application of advanced numerical analysis tools to solve, for example, structural and fluid-related design problems.
- Their knowledge and skills will be focused, at a more advanced level, on practical industrial applications of the science and technology underpinning their discipline.
- They will have broadened their appreciation of the social and ethical aspects of their profession through interdisciplinary team work, including in appropriate leadership roles.
- MEng graduates will gain a deeper understanding of multiphysics modelling through, for example by studying the advanced FEA and CFD module.
- In the Stage 5 group Design for Excellence Project, MEng students will apply their subject specialist knowledge of mechanical engineering, e.g. power transmission systems, thermo-fluids engineering and manufacturing, to a wider engineering design project.

5. Relevant QAA Subject Benchmark Group(s)

This QAA Engineering Subject Benchmark Statement² defines the academic standard expected of graduates with an engineering degree. The defined learning outcomes are those published by the Engineering Council in the UK Standard for Professional Engineering Competence (UK-SPEC): The Accreditation of Higher Education Programmes³. AHEP 4th edition was published on 31 August 2020 and will be implemented by 31 December 2021. The learning outcomes defined here will be aligned with AHEP 4th in future versions of this document.

6. Programme Structure

The MEng Mechanical Engineering programme structure has been developed in line with the new university Education and Student Experience strategy. To meet the Subject Benchmark requirements³, modules are delivered, where possible, in a 60 credits per semester format and include elements of both research informed teaching and industry professional requirements.

The programme was developed from the long standing Mechanical Engineering programme, but was revised to account for feedback from accrediting bodies and student liaison committees. The overwhelming majority of the content and learning outcomes are the same, but the organisation of delivery has been refined. An example of this is within stage 1, where to improve the student learning experience and to provide a more effective delivery mode for stage one modules, the “Engineering Design” and the “Engineering Practice and Experimental Techniques” modules extend over two semesters. These modules bring together students from the different engineering programmes to gain a basic understanding of Design and CAD skills, and to apply problem-based, and student-centred, learning, with a view to developing a more holistic understanding of their subject and how it sits within a wider engineering context.

A significant change is that the entrants to the BEng/MEng programme have the opportunity of a “with Composites” pathway in Stages 4 & 5, as opposed to Composites being studied as a separate programme.

The academic year 2020-2021 was the first year of transition towards this new format of delivery, with the introduction of Stage 1 and Stage 5 for the MEng programmes. The new format for stages 2 and 4 will be introduced in academic year 2021-2022. Details of this transition and the relationship between the old and revised format of the programmes can be found in section 12 of this document. Students

The following tables summarise the year-by-year content delivered in the academic year 2021-2022.

² <http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15.pdf>

³ [The Accreditation of Higher Education Programmes: Third edition](#)

STAGE 1							
Duration	Module Code	Credits	Module Title	CW (%)	P (%)	Exam (%)	Test (%)
S1+S2	ENGR101	20	Engineering Design	70			30
S1+S2	ENGR102	20	Engineering Practice and Experimental Techniques	100			
S1	ENGR103	20	Engineering Science	50		50	
S1	ENGR104	20	Engineering Mathematics	50		50	
S2	ENGR105	20	Engineering Mechanics & Structures	50		50	
S2	ENGR106	20	Engineering Materials	50		50	
S2	BPIE115	-	Stage 1 Mechanical Placement Preparation	-	-	-	-
STAGE 2							
S1+S2	MATS235	20	Materials & Structural Integrity	50		50	
S1+S2	MECH233	20	Manufacturing Processes	100			
S1	MECH234	20	Thermo-Fluids	30		70	
S1	CONT222	20	Engineering Maths & Control	30		70	
S2	MFRG209	20	Engineering Quality Management	30		70	
S2	MECH235	20	Mechanical Engineering Design & Commercialisation*	70			30
S1+S2	BPIE215	-	Stage 2 Mechanical Placement Preparation	-	-	-	-
(* MECH235 should be timetabled alongside MARN221)							
STAGE 3							
<p align="center"><i>BPIE335 Engineering Related Placement (Generic)</i></p> <p>All students are encouraged to complete a period of work experience (placement) lasting 48 weeks.</p> <p>Students' progress is monitored by a visiting tutor, who will also assess the Professional Training Report at the end of the placement. Students who successfully complete a placement (including interim and final reports) to the satisfaction of their academic tutor and industry supervisor will have their degree endorsed as a 'sandwich' award, in recognition of their industrial experience.</p>							PASS / FAIL
STAGE 4							
S1+S2	PRME307	40	ME Honours Project (with Research Methods)	100			

S1	MECH341	20	Computer Aided Engineering (FEA/CFD)	70			30
S1	THER307	20	Thermal-Fluids Engineering	50		50	
S2	MECH342	20	Mechanical Engineering Design in Practice	100			
S2	CONT317	20	Control and Intelligent Systems Design	30		70	
STAGE 5 – ME Pathway							
Students in Stage 5 study 80 credits of core modules + 40 credits from pathway electives.							
Core Modules – 80 credits							
S1+S2	MECH550	40	Design for Excellence	100			
S1	MECH545	20	Advanced FEA & CFD	100			
S1	ROCO508Z	20	Intelligent Sensors and Control for Autonomous	50			50
Electives – 40 credits							
S2	MECH544	20	Data Processing, Simulation and Optimisation	100			
S2	MAR536	20	Mechanics of MRE Structures	50		50	
S2	MECH549	20	Medical Engineering and Biomechanics	30		70	
S2	MECH551	20	Advanced Materials & Engineering Nanotechnology	50	50		

7. Programme Aims

The School of Engineering, Computing and Mathematics has adopted common aims for all engineering degree programmes:

- To be informative and challenging, and to establish a knowledge base suitable for a future career in engineering or for further study.
- To give students with a variety of entry qualifications an opportunity to realise their potential.
- To enrich curriculum content and teaching quality through the professional and research expertise of staff, and through links with industry.
- To encourage and support students to develop and learn to apply technical and transferable skills that will facilitate life-long learning and continuing professional development.
- To produce graduates who can make a significant contribution to their professional field.

The programme aims to produce graduates that should be able to:

- Adopt an integrated approach to engineering design, manufacturing, materials and engineering at an advanced level;
- Demonstrate appropriate knowledge of the scientific principles which underpin the practice of mechanical engineering;
- Apply advanced analytical skills in applying the principles of engineering science to the solution of problems in the context of design, analysis and manufacture of sophisticated products and systems;
- Apply practical skills in engineering measurement and instrumentation, including the use of virtual engineering tools (FEA, CFD and CAD) at an advanced level;
- Specify processes and technologies used in engineering manufacture;
- Demonstrate an awareness, to a high degree of understanding, of standards, codes of practice, risk assessment and reliability relevant to Mechanical Engineering and its derivative disciplines;
- Display an awareness of the mechanical engineer's role in business, and his/her responsibilities to society and the natural environment;
- Provide students with the knowledge and skills to solve multidisciplinary problems in the context of design, analysis and manufacture of sophisticated products and systems;
- Work effectively as the leader of a team and be able to communicate results and outcomes using both top-down and bottom-up approaches.

8. Programme Intended Learning Outcomes

The general and specific learning outcomes for both pathway BEng/MEng Mechanical Engineering, and Mechanical Engineering with Composites, programmes are fully aligned with UK-SPEC (Standards for Professional Engineering Competence)^{4 5}, which has been adopted as the QAA subject benchmark for engineering. These are presented in detailed in the next section and are mapped to the constituent modules of the BEng/MEng programmes in Appendix 1. In Stage 5 of the programme students will study emerging technologies at an advanced level, as exemplified by the core modules detailed in Section 6. An acceptable threshold level of competence is indicated by the award, with a spectrum of competence reflected in the degree classification of any individual graduate.

8.1. Knowledge and Understanding

Mechanical engineering is underpinned by science and mathematics, and other associated disciplines, as defined by the relevant accrediting professional engineering institutions. On completion, graduates will need:

- 1) SM1m

⁴ [Accreditation of HE Programmes \(AHEP\): Collated learning outcomes for six areas of learning](#)

⁵ <http://www.engc.org.uk/standards-guidance/standards/uk-spec/>

A comprehensive knowledge and understanding of the scientific principles and methodology necessary to underpin their education in mechanical engineering, and an understanding, and know-how, of the scientific principles of related disciplines, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies.

- 2) SM2m
Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in mechanical engineering and to enable them to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of real engineering problems.
- 3) SM3m
Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of mechanical engineering and the ability to evaluate them critically and to apply them effectively.
- 4) SM4m
Awareness of developing technologies related to mechanical engineering.
- 5) SM5m
A comprehensive knowledge and understanding of mathematical and computational models relevant to mechanical engineering, and an appreciation of their limitations.
- 6) SM6m
Advanced understanding of concepts from a range of areas, including some outside engineering, and the ability to evaluate them critically and to apply them effectively in engineering projects.

8.2. Cognitive and Intellectual Skills

Engineering analysis involves the application of engineering concepts and tools for the solution of engineering problems. On completion graduates should have developed:

- 1) EA1m
Understanding of mechanical engineering principles and the ability to apply them to the critical analysis of key engineering processes and decisions.
- 2) EA2
Ability to identify, classify and describe the performance of systems and components using suitable analytical methods and modelling techniques.
- 3) EA3m
Ability to apply quantitative and computational methods, using alternative approaches and understanding their limitations, in order to solve engineering problems and implement appropriate action.
- 4) EA4m
Understanding of, and the ability to apply, an integrated or systems approach to solving complex engineering problems.
- 5) EA5m

Ability to use fundamental knowledge to investigate new and emerging technologies.

6) EA6m

Ability to extract and evaluate pertinent data and to apply engineering analysis techniques in the solution of unfamiliar problems.

8.3. Key and Transferrable Skills

The process of design in mechanical engineering at this level is a key skill and competence and involves the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges and integrates, at an advanced level, engineering understanding, knowledge and skills to the solution of real problems.

1) D1

Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.

2) D2

Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards.

3) D3m

Work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies.

4) D4

Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal.

5) D5

Plan and manage the design process, including cost drivers, and evaluate outcomes.

7) D6

Communicate their work to technical and non-technical audiences.

8) D7m

Demonstrate wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations.

9) D8m

Demonstrate the ability to generate an innovative design for products, systems, components or processes to fulfil new needs.

8.4. Employment Related Skills

Mechanical and other engineering activities can have impacts on the environment, on commerce, on society and on individuals. On successful completion, mechanical engineering graduates therefore need the skills to manage their activities and to be

aware of the various legal and ethical constraints under which they must operate, including:

- 1) EL1m
Understanding of the need for a high level of professional and ethical conduct in engineering; a knowledge of professional codes of conduct and how ethical dilemmas can arise.
- 2) EL2
Knowledge and understanding of the commercial, economic and social context of mechanical engineering processes.
- 3) EL3m
Knowledge and understanding of management techniques that, including project and change management, may be used to achieve engineering objectives, their limitations, and how they may be applied appropriately.
- 4) EL4
Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate.
- 5) EL5m
Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues, and an awareness that these may differ internationally.
- 6) EL6m
Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques and an ability to evaluate commercial risk.
- 7) EL7m
Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction.

8.5. Practical Skills

This is the practical application of advanced engineering skills, combining theory and experience, and the use of relevant knowledge and skills. On successful completion mechanical engineering graduates should have developed:

- 1) P1
Understanding of contexts in which engineering knowledge is applicable to operations and management, and to the application and development of technology.
- 2) P2m
Knowledge of characteristics of particular equipment, processes or products, with extensive knowledge and understanding of a wide range of mechanical engineering materials and components.
- 3) P3
Ability to apply relevant practical and laboratory skills, and at an advanced level.
- 4) P4m

- Understanding of the use of technical literature and other information sources.
- 5) P5
Knowledge of relevant legal and contractual issues.
 - 6) P6
Understanding of appropriate codes of practice and industry standards.
 - 7) P7
Awareness of quality issues and their application to continuous improvement
 - 8) P8m
Ability to work with technical uncertainty.
 - 9) P9m
A thorough understanding of current practice and its limitations, and some appreciation of likely new developments.
 - 10) P10m
Ability to apply engineering techniques taking account of a range of commercial and industrial constraints.
 - 11) P11m
Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.

Additional General Skills (Required for Accreditation)

On successful completion, mechanical engineering graduates will have developed the following additional competences that will be of value in a wide range of employment situations. These will include the ability to:

- 1) G1
Apply advanced problem solving skills, communication, working with others, information retrieval and the effective use of advanced IT facilities.
- 2) G2
Plan self-learning and improve performance, as the foundation for lifelong learning and CPD.
- 3) G3m
Monitor and adjust a personal programme of work on an on-going basis.
- 4) G4
Exercise initiative and personal responsibility, which may be as a team member or the team leader.

9. Admissions Criteria, including APCL, APEL and DAS arrangements

All applicants must have GCSE (or equivalent) Maths and English at Grade C or above.

Entry Requirements for all three MEng programmes (2014)	
A-level/AS-level	120 - 136 UCAS points, a typical offer would be 136 points to include C @ Maths & C @ 2nd relevant science or technology subject. Excluding General Studies.

BTEC National Diploma/QCF Extended Diploma	Not accepted
Access to Higher Education at level 3	Not accepted
Welsh Baccalaureate	120 points from Welsh Baccalaureate – accepted as additional points in addition to the two A-Levels described above
Scottish Qualifications Authority	320 points including grade C in a relevant subject at Advanced Higher Level (applied ICT; applied science; biology; chemistry; computing; DT (product design); DT (systems and control tech); DT (textiles tech); electronics; engineering; environmental science; maths/further maths; stats; physics; science; tech and design). Plus pass Higher level maths.
Irish Leaving Certificate	Grades required: ABBBB including mathematics and a science or technology subject at higher level plus Ordinary Level Grade C Maths and English.
International Baccalaureate	32 overall to include 5 in mathematics, science or a technology subject at Higher Level. If overseas and not studying English within IB, must have IELTS 6.0 overall with 5.5 in all other elements.

A minimum 120 - 136 points are required for entry to MEng. This must normally include grade C in mathematics and at least one science/technology subject. A complete list of current UK and equivalent European qualifications⁶ and English Language requirements for overseas applicants⁷ can be found on the University website.

Exceptionally, direct entry to stages 2 and 4 is possible, provided that previous equivalent study at the appropriate levels can be demonstrated to the satisfaction of the Programme Manager. Direct entry to stage 5 is not permitted. In addition, enrollment to study on a part-time basis is possible at any stage. The sequencing of the modules to be studied part-time will be mutually agreed with the Programme Manager at enrollment.

The University has strategies to promote equality of opportunity, widen participation and encourage access. Applications are welcomed from younger students from disadvantaged backgrounds, mature students and people with disability. Disability Services supports disabled students across the University ¹⁰.

Partnership Arrangements

Direct Entry - FDS students from Partner College

⁶ <http://www1.plymouth.ac.uk/courses/undergraduate/3383/Pages/EntryRequirements.aspx>

⁷ <http://www1.plymouth.ac.uk/internationalplymouth/Pages/entry.aspx>

Where a progression agreement exists with a Partner College then direct entry to Stage 4 is possible for students progressing with a good FdSc, provided that a suitable attainment level can be demonstrated. Where the attainment level is judged to be lower, then progression to Stage 2 (Level 5) is required.

10. Progression criteria for Final and Intermediate Awards

- 120 credits at Level 4 are required for the award of Certificate of Higher Education (Cert. HE).
- 120 credits at Level 4 plus 120 credits at Level 5 are required for the award of Diploma of Higher Education (Dip. HE).
- The award of BEng (Hons) requires achievement in 360 credits, of which 120 are at Level 4, 120 are at level 5, and 120 are at level 6. Where a student does not achieve 360 credits, but achieves 320 credits, then a BEng degree can be awarded.

The Honours classification follows the standard University Regulations for Bachelors' Degrees with weightings as follows:

Level 4 (Stage 1): 10% (from the best 80 credits)

Level 5 (Stage 2): 30%

Level 6 (Stage 4): 60%

- The award of MEng (Hons) will be awarded to a student who has achieved 480 credits, of which 120 are at Level 4, 120 at Level 5, 120 at Level 4, and 120 at Level 7.

In this case, the Honours classification would follow the standard University Regulations for Integrated Master's Degrees with weightings as follows:

Level 4 (Stage 1): 10% (from the best 80 credits)

Level 5 (Stage 2): 20%

Level 6 (Stage 4): 30%

Level 7 (Stage 5): 40%

The Final Award Title will be determined by the chosen programme pathway followed:

- ME: "Mechanical Engineering"
- MEC: "Mechanical Engineering with Composites"

Transfer Routes

Stage 1 is common to a suite of BEng (Hons) and MEng (Hons) programmes. Students who achieve 120 credits at Stage 1 would normally progress to Stage 2 of their chosen programme but, if they wish, they could transfer to a different programme in the suite with the agreement of the Programme Manager(s).

Students on the MEng (Hons) programme are expected to achieve a minimum weighted average grade of 60% at each Stage. Students who do not achieve this standard may be advised to transfer to the same named BEng (Hons) programme.

Students on the MEng (Hons) programme who wish to leave the programme early, and exit with a BEng (Hons) award, should transfer to the same named BEng (Hons) programme by Easter in Stage 4. Students on Stage 5 of the MEng (Hons) programme who wish to leave the programme early, and exit with a BEng (Hons) award, will need to withdraw from the programme.

11. Non-Standard Regulations

For professional accreditation purposes the following regulations apply:

The pass mark for a module at Levels 4 - 6 is 40%. Where module assessment involves more than one element, a student is also required to achieve a minimum of 30% in each element.

The pass mark for a module at Level 7 is 50%. Where module assessment involves more than one element, a student is also required to achieve a minimum of 40% in each element.

The maximum compensation allowed within each award is 20 credits for Level 4 modules (Stage One) only.

12. Transition Arrangements

As stated previously, the academic year 2020-2021 was the first year of transition towards a new method of delivering the MEng Mechanical Engineering programme. The table below is intended to indicate the similarity of this new revised programme relative to the currently accredited MEng programmes. To retain accreditation, which is valid for the intakes 2017-2021, it is necessary that any change to the programme content (not structure), during a revision such as this, should be less than 25%. Here the programme content remains largely the same in terms module indicative content with only 3 new modules being created. This is well within accreditation retention requirements.

Entrants to the programme in September 2020 will experience the programme as detailed below. For earlier cohorts who commenced the programme prior to Sept'20, transition to this structure is shown in the column New Module Start year. Stage 3, the Industrial Placement year, will continue to operate in its current format.

Where a student is required to achieve the necessary credits on a version of a module no longer delivered, the table below indicates the equivalent replacement module (regarding accredited content and programme learning outcomes) that students will typically be offered in the new structure.

Current Module Code(s)	Credits	Module Title	New Module Code	New Module Start Year	Semester
Stage 1/Level 4 All Pathways					
MECH119 MECH121	20	Engineering Design	ENGR101	2020/21	S1 + S2
None	20	Engineering Practice and Experimental Techniques	ENGR102	2020/21	S1 + S2
MECH118 THER104	20	Engineering Science	ENGR103	2020/21	S1
MATH187	20	Engineering Maths	ENGR104	2020/21	S1
MECH117	20	Engineering Mechanics & Structures	ENGR105	2020/21	S2
MATS122	20	Engineering Materials	ENGR106	2020/21	S2
BPIE115	-	Stage 1 Mechanical Placement Preparation	BPIE115	-	S2

Current Module Code(s)	Credits	Module Title	New Module Code	New Module Start Year	Semester
Stage 2/Level 5 All Pathways					
STRC203	20	Materials & Structural Integrity	MATS235	2021/22	S1 + S2
None	20	Manufacturing Processes	MECH233	2021/22	S1 + S2
HYFM230 THER207	20	Thermo-Fluids	MECH234	2021/22	S1
MFRG208 MFRG311	20	Engineering Quality Management	MFRG209	2021/22	S2
MECH232 STO208	20	Mechanical Engineering Design & Commercialisation	MECH235	2021/22	S2
CONT221	20	Engineering Maths & Control	CONT222	2021/22	S1
BPIE215	-	Stage 2 Mechanical Placement Preparation	BPIE215	-	S1 + S2
Stage 4/Level 6 Mechanical Engineering Pathway					
PRME307	40	ME Honours Project (with Research Methods)	PRME307	2021/22	S1 + S2
HYFM322	20	Computer Aided Engineering (FEA/CFD)	MECH341	2021/22	S1
MECH340	20	Mechanical Engineering Design in Practice	MECH342	2021/22	S2
THER307	20	Thermo-Fluid Engineering	THER307	2021/22	S1
CONT317 MARN340	20	Control and Intelligent Systems Design	CONT317	2021/22	S2
Stage 4/Level 6 Mechanical Engineering with Composites Pathway (for AY2020/2021 entrants only)					
PRME307	40	MEC Honours Project (with Research Methods)	PRME307	2021/22	S1 + S2

HYFM322	20	Computer Aided Engineering (FEA/CFD)	MECH341	2021/22	S1
MATS347	20	Composites Design and Manufacture	MATS347	2021/22	S1
CONT317	20	Control and Intelligent Systems Design	CONT317	2021/22	S2
MATS348	20	Composites Engineering	MATS348	2021/22	S2

Stage5/Level 7 Mechanical Engineering Pathway					
Students in Stage 5 study 80 credits of core modules + 40 credits from pathway electives.					
Core Modules – 80 credits					
MECH534 PRCE513	40	Design for Excellence	MECH550	2020/21	S1 + S2
MECH532	20	Advanced FEA & CFD	MECH545	2020/21	S1
ROCO505Z	20	Intelligent Sensors and Control for Autonomous Systems	ROCO508Z	2020/21	S1
Electives – 40 credits					
MECH544	20	Data Processing, Simulation and Optimisation	MECH544	2020/21	S2
		Medical Engineering and Biomechanics	MECH549	New for 2022/23	S2
MECH542	20	Advanced Materials & Engineering Nanotechnology	MECH551	2020/21	S2
MAR528Z	20	Mechanics of MRE Structures	MAR536	2020/21	S2

Stage5/Level 7 Mechanical Engineering with Composites Pathway Composites (for AY2020/2021 entrants only)					
Students in Stage 5 study 120 credits of core modules.					
MECH534 PRCE513	40	Design for Excellence	MECH550	2020/21	S1 + S2
MECH532	20	Advanced FEA & CFD	MECH545	2020/21	S1
MECH542	20	Advanced Materials & Engineering Nanotechnology	MECH551	2020/21	S2
MAR528Z	20	Mechanics of MRE Structures	MAR536	2020/21	S2
None	20	Advanced Composites Technology	MATS500	2020/21	S1

The schedule of the changes to all Mechanical and Marine Engineering degrees is given below:

Academic Year	BEng Mechanical	BEng Mechanical	MEng Mechanical	MEng Mechanical	BEng Marine Technology	MEng Marine Technology
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	with Composites Degree	with Composites Pathway	with Composites Degree	with Composites Pathway	with Composites Pathway	with Composites Pathway
21-22	Stage 4 available	Stage 4 not available	Stage 4 & 5 available	Stage 4 & 5 not available	Stage 4 not available	Stage 4 & 5 not available
Accreditation Visit from Accrediting Bodies						
22-23	Stage 4 for entrants prior to AY20-21	Stage 4 available for AY20-21 entrants.	Stage 4 & 5 for entrants prior to AY20-21	Stage 4 available for AY20-21 entrants. Stage 5 not available.	Stage 4 available for AY20-21 entrants.	Stage 4 available for AY20-21 entrants.
23-24	All entrants prior to AY20-21 should have graduated.	Should be sole Mech with Composites route.	Stage 5 for entrants prior to AY20-21	Stage 5 available for AY20-21 entrants.	Ongoing programme	Stage 5 available for AY20-21 entrants.
24-25	Only running for exceptional cases.	Main Mech with Composites route.	Only running for exceptional cases.	Main Mech with Composites route.	Ongoing programme	Ongoing programme

Appendices

Programme Specification Mapping (UG) – core/elective modules

Table A.1 MEng (Hons) Mechanical Engineering (for AY 20/21 Intakes)

MEng (Hons) Mechanical Engineering	ILOS	Mechanics and Structures	Engineering Design	Engineering Science	Engineering Materials	Engineering Practice and Experimental Techniques	Engineering Mathematics	Stage 1 Mechanical Placement Preparation	ILOS Achieved	Mechanical Engineering Design & Commercialisation	Engineering Materials and Structural Integrity	Manufacturing Processes	Thermo-Fluids	Engineering Quality Management	Engineering Mathematics and Control	Stage 2 Mechanical Placement Preparation	ILOS Achieved	Engineering Honours Project	Computer Aided Engineering	Mechanical Engineering Design and Practice	Control and Intelligent Systems Design	Thermal-Fluids Engineering	Stage 3 Mechanical Engineering Related Placement	ILOS Achieved	Design for Excellence	Advanced Materials & Nanotechnology	Advanced FEA & CFD	Data Processing, Simulation and Optimisation of Engineering Systems	Intelligent Sensors and Control for Autonomous	Mechanics of MRE structures	Medical Engineering and Biomechanics	ILOS Achieved				
Award Learning Outcomes contributed to	Prog	ENGR105	ENGR101	ENGR103	ENGR106	ENGR102	ENGR104	BPIE115	Level 4	MECH235	MATS235	MECH233	MECH234	MFRG209	CONT222	BPIE215	Level 5	PRME307	MECH341	MECH342	CONT317	THER307	BPIE335	Level 6	MECH550	MECH551	MECH545	MECH544	ROCO508Z	MAF536	MECH549	Level 7				
Credits		20	20	20	20	20	20	0		20	20	20	20	20	20	0		40	20	20	20	20	20	0		40	20	20	20	20	20	20				
Core / Elective		C	C	C	C	C	C	C		C	C	C	C	C	C	C		C	C	C	C	C	C		C	C	C	E	E	E	E					
8.1 Knowledge & Understanding	SM1m	X		X	X	X			SM1m	X	X	X	X				SM1m		X			X		SM1m					x	x	x	x	SM1m			
	SM2m	X		X			X		SM2m	X	X		X				SM2m	X	X			X		SM2m					x	x	x		SM2m			
	SM3m	X	X		X				SM3m		X		X	X			SM3m	X		X				SM3m	X	X			x	x	x		SM3m			
	SM4m						X		SM4m								SM4m			X				SM4m	X		X		x	x	x		SM4m			
	SM5m								SM5m	X	X						SM5m							SM5m		X	X		x	x	x		SM5m			
	SM6m								SM6m								SM6m							SM6m	X							x	SM6m			
8.2 Cognitive and Intellectual Skills	EA1m	X	X	X	X	X			EA1m	X	X	X	X	X			EA1m		X	X	X	X		EA1m	X				x	x	x		EA1m			
	EA2	X			X		X		EA2	X	X	X	X	X			EA2		X	X	X	X		EA2		X	X		x	x	x		EA2			
	EA3m	X		X		X	X		EA3m	X	X	X	X		X		EA3m	X	X	X	X	X		EA3m		X	X					x	EA3m			
	EA4m		X						EA4m					X	X		EA4m			X	X			EA4m	X				x	x	x		EA4m			
	EA5m								EA5m								EA5m				X			EA5m	X	X				x	x	x		EA5m		
	EA6m					X			EA6m	X	X						EA6m				X			EA6m	X	X				x	x	x		EA6m		
8.3 Key and Transferable Skills	D1		X						D1	X				X			D1			X				D1	X								x	D1		
	D2		X						D2	X	X	X	X	X			D2	X		X				D2	X	X							x	D2		
	D3m		X						D3m	X		X	X				D3m		X	X				D3m	X						x	x		D3m		
	D4		X						D4	X	X			X			D4			X		X		D4	X	X					x	x		D4		
	D5		X		X				D5	X							D5	X	X	X				D5	X									D5		
	D6		X		X				D6	X							D6	X	X	X				D6	X									D6		
	D7m		X						D7m								D7m							D7m	X	X			x	x	x		D7m			
	D8m		X						D8m		X						D8m							D8m	X								x	D8m		
8.4 Employment Related Skills	EL1m		X						EL1m								EL1m	X		X				EL1m	X									x	EL1m	
	EL2		X						EL2	X							EL2			X				EL2	X							x	x		EL2	
	EL3m								EL3m	X				X			EL3m			X				EL3m	X										EL3m	
	EL4		X						EL4	X							EL4			X				EL4	X										EL4	
	EL5m								EL5m	X							EL5m							EL5m	X									x	EL5m	
	EL6m								EL6m	X							EL6m	X						EL6m	X	X								x	EL6m	
	EL7m								EL7m								EL7m							EL7m	X				x					EL7m		
8.5 Practical Skills	P1			X	X				P1					X			P1	X			X			P1	X										P1	
	P2m					X			P2m		X	X			X		P2m	X		X				P2m	X	X					x	x	x		P2m	
	P3		X			X			P3		X	X					P3	X		X				P3	X	X			x	x	x	x			P3	
	P4				X	X			P4	X				X			P4	X		X				P4	X	X	X		x	x	x				P4	
	P5								P5	X							P5			X				P5		X									P5	
	P6		X			X			P6					X			P6			X				P6	X										P6	
	P7								P7	X				X			P7			X				P7	X										P7	
	P8		X						P8	X							P8	X	X	X				P8	X	X	X									P8
	P9m								P9m								P9m							P9m	X											P9m
	P10m								P10m								P10m							P10m	X							x	x			P10m
	P11m		X						P11m	X							P11m			X				P11m	X										P11m	
Additional General Skills	G1		X						G1	X		X			X		G1	X	X	X				G1	X		X	x	x	x	x				G1	
	G2					X		X	G2								G2	X					X	G2	X		X								G2	
	G3m								G3m	X							G3m	X		X				G3m	X											G3m
	G4		X			X			G4	X							G4	X		X				G4	X							x	x			G4
Compensation Y/N		Y	Y	Y	Y	Y	Y			N	N	N	N	N	N			N	N	N	N	N			N	N	N	N	N	N	N	N	N			

Table A.2 MEng (Hons) Mechanical Engineering with Composites (for AY 20/21 Intakes)

MEng (Hons) Mechanical Engineering (with Composites)	ILOS	Mechanics and Structures	Engineering Design	Engineering Science	Engineering Materials	Engineering Practice and Experimental Techniques	Engineering Mathematics	Stage 1 Mechanical Placement Preparation	ILOS Achieved	Mechanical Engineering Design & Commercialisation	Engineering Materials and Structural Integrity	Manufacturing Processes	Thermo-Fluids	Engineering Quality Management	Engineering Mathematics and Control	Stage 2 Mechanical Placement Preparation	ILOS Achieved	Engineering Honours Project	Computer Aided Engineering	Composites Engineering	Control and Intelligent Systems Design	Composites Design and Manufacture	Stage 3 Mechanical Engineering Related Placement	ILOS Achieved	Design for Excellence	Advanced Materials & Nanotechnology	Advanced FEA & CFD	Advanced Composites Technology	Mechanics of MRE Structures	Medical Engineering and Biomechanics	ILOS Achieved		
Award Learning Outcomes contributed to	Prog	ENGR105	ENGR101	ENGR103	ENGR106	ENGR102	ENGR104	BPIE115	Level 4	MECH235	MATS235	MECH233	MECH234	MFRG209	CONT222	BPIE215	Level 5	PRME307	MECH341	MATS348	CONT317	MATS347	BPIE335	Level 6	MECH550	MECH551	MECH545	MATS500	MAR536	MECH549	Level 7		
Credits		20	20	20	20	20	20	0		20	20	20	20	20	20	0		40	20	20	20	20	0		40	20	20	20	20	20	20		
Core / Elective		C	C	C	C	C	C	C		C	C	C	C	C	C	C		C	C	C	C	C	C		C	C	C	C	E	E			
8.1 Knowledge & Understanding	SM1m	X		X	X	X			SM1m	X	X	X	X				SM1m		X				X	SM1m						x	x	SM1m	
	SM2m	X		X			X		SM2m	X	X		X				SM2m	X	X	X		X		SM2m						x		SM2m	
	SM3m	X	X		X				SM3m		X			X	X		SM3m	X						SM3m	X	X				x	x	SM3m	
	SM4m						X		SM4m								SM4m		X	X				SM4m	X		X	X	x	x	x	SM4m	
	SM5m								SM5m	X	X						SM5m			X		X		SM5m		X	X	X	x	x		SM5m	
	SM6m								SM6m								SM6m		X					SM6m	X		X			x		SM6m	
8.2 Cognitive and Intellectual Skills	EA1m	X	X	X	X	X			EA1m	X	X	X	X	X			EA1m		X	X	X	X		EA1m	X				X	x		EA1m	
	EA2	X			X		X		EA2	X	X	X	X	X			EA2		X	X				EA2		X	X	X	x	x	x	EA2	
	EA3m	X		X		X	X		EA3m	X	X	X	X		X		EA3m	X	X	X	X	X		EA3m		X	X	X			x		EA3m
	EA4m		X						EA4m					X	X		EA4m			X				EA4m	X					x		EA4m	
	EA5m								EA5m								EA5m				X			EA5m	X	X		X	x	x		EA5m	
	EA6m				X				EA6m	X	X						EA6m		X	X	X			EA6m	X	X			x	x		EA6m	
8.3 Key and Transferable Skills	D1		X						D1	X				X			D1			X				D1	X						x		D1
	D2		X						D2	X	X	X	X	X			D2	X		X		X		D2	X	X		X			x		D2
	D3m		X						D3m	X			X				D3m		X					D3m	X					x			D3m
	D4		X						D4	X	X			X			D4			X				D4	X	X		X	x				D4
	D5		X		X				D5	X							D5	X						D5	X								D5
	D6		X		X				D6	X							D6	X	X	X				D6	X								D6
	D7m		X						D7m								D7m		X					D7m	X	X				x			D7m
	D8m		X						D8m		X						D8m					X		D8m	X						x		D8m
8.4 Employment Related Skills	EL1m		X						EL1m								EL1m	X						EL1m	X						x		EL1m
	EL2		X						EL2	X							EL2		X					EL2	X						x		EL2
	EL3m								EL3m	X				X			EL3m		X					EL3m	X								EL3m
	EL4		X						EL4	X							EL4		X					EL4	X								EL4
	EL5m								EL5m	X							EL5m		X			X		EL5m	X			X			x		EL5m
	EL6m								EL6m	X							EL6m	X	X	X		X		EL6m	X	X					x		EL6m
	EL7m								EL7m								EL7m		X					EL7m	X								EL7m
8.5 Practical Skills	P1			X	X				P1					X			P1	X		X	X			P1	X								P1
	P2m					X			P2m		X	X			X		P2m	X		X		X		P2m	X	X				x	x		P2m
	P3		X			X			P3		X	X					P3	X				X		P3	X	X				x	x		P3
	P4				X	X			P4	X				X			P4	X		X				P4	X	X	X			x			P4
	P5								P5	X							P5			X				P5		X							P5
	P6		X			X			P6					X			P6					X		P6	X			X					P6
	P7								P7	X				X			P7					X		P7	X								P7
	P8		X						P8	X							P8	X	X					P8	X	X	X						P8
	P9m								P9m								P9m					X		P9m	X								P9m
	P10m								P10m								P10m							P10m	X					x			P10m
	P11m		X						P11m	X							P11m		X			X		P11m	X								P11m
Additional General Skills	G1		X						G1	X		X			X		G1	X	X	X		X		G1	X		X			x			G1
	G2					X		X	G2								G2	X		X		X	X	G2	X		X						G2
	G3m								G3m	X							G3m	X						G3m	X								G3m
	G4		X			X			G4	X							G4	X		X				G4	X					x			G4
Compensation Y/N		Y	Y	Y	Y	Y	Y			N	N	N	N	N	N			N	N	N	N	N			N	N	N	N	N	N	N		

Table A.3 MEng (Hons) Mechanical Engineering (for Intakes prior to AY 20/21)

Output Standards Matrix: BEng / MEng Mechanical Engineering																																										
Programme Title:	Stage 1				Stage 2				Stage 4				Stage 5 (MEng only)																													
BEng / MEng Mechanical Engineering	Module numbers (where the output criteria statements are addressed)																																									
	MECH120	MECH118	A5MFT1	MATH187	MECH121	PP	MATS122	MECH117	BP/IE115	THER104	BP/IE215	HYFM230	STO208	MECH232	STRC203	THER207	CONT221	MFRG208	MATS234	PRME307	HYFM322	MECH339	MECH340	MFRG311	THER307	CONT317	MECH532	MECH533	MAR528	PRCE513	MECH534	MECH544										
General Learning Outcomes (see EABI/ACC2 - Appendix A for more details)																																										
Knowledge and Understanding																																										
KU1		✓			✓		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
KU2		✓			✓		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
KU3					✓									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
Intellectual Abilities																																										
IA1		✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
IA2					✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
IA3					✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Practical skills																																										
PS1	✓		✓		✓	✓				✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
General transferable skills																																										
GT1		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Specific Learning Outcomes (see EABI/ACC2 - Appendix B for more details)																																										
Underpinning Science & Mathematics																																										
US1		✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
US1m																																					✓	✓				
US2		✓		✓		✓	✓	✓		✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
US2m																																						✓	✓			
US3		✓			✓	✓				✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
US3m																																						✓	✓			
US4m																																						✓	✓			
Engineering Analysis																																										
E1		✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
E1m																																						✓	✓			
E2		✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
E2m																																							✓	✓		
E3		✓	✓		✓	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
E3m																																							✓	✓		
E4					✓	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Design																																										
D1					✓	✓							✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
D1m																																							✓	✓		
D2					✓	✓							✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
D3					✓								✓								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
D4					✓		✓						✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
D4m																																							✓	✓		
D5					✓	✓								✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
D6					✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Economic, social & environmental context																																										
S1					✓	✓							✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
S1m																																							✓	✓		
S2					✓								✓																											✓	✓	
S2m																																								✓	✓	
S3					✓					✓				✓																											✓	✓
S4					✓								✓																												✓	✓
S5		✓				✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Engineering Practice																																										
P1		✓	✓		✓	✓			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P1m																																								✓	✓	
P2			✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P2m																																									✓	✓
P3		✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P4		✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P5					✓	✓							✓																												✓	✓
P6		✓			✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P7		✓			✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
P8					✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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