| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester 1, 2, or Full Year* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(1BG1) First University Examination in Engineering (Biomedical)** | | | | | | | | |
| | CH140 | Engineering Chemistry | 5 | 1 | 1 | 2 + c/a | All BE Programmes | |
| | CT1110 | Engineering Computing I | 5 | 1 | 1 | 2 + c/a | All BE Programmes, BCM | |
| | EI160 | Engineering Graphics | 5 | 1 | 1 | 2hr computer based exam + c/a | All BE Programmes, BCM | |
| | MA140 | Engineering Calculus | 5 | 1 | 1 | 2 + c/a | All BE Programmes | |
| | MP120 | Engineering Mechanics | 5 | 1 | 1 | 2 + c/a | All BE Programmes | |
| | CT1111 | Engineering Computing II | 5 | 2 | 2 | 2 + c/a | All BE Programmes | |
| | EI150 | Engineering Design | 10 | 2 | 2 | c/a | All BE Programmes, BCM | |
| | MM140 | Engineering Mathematical Methods | 5 | 2 | 2 | 2 + c/a | All BE Programmes | |
| | PH140 | Engineering Physics | 5 | 2 | 2 | 2 + c/a | All BE Programmes | |
| | EI140 | Fundamentals of Engineering | 10 | Full Year | 1 + 2 | 2 + c/a | All BE Programmes | |
| ***TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS*** | | | | | | | | |
| *Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a* | | | | | | | | |

| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester 1, 2, or Full Year* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(2BG1) Second University Examination in Engineering (Biomedical)** | | | | | | | | |
| | AN230 | Human Body Structure | 5 | 1 | 1 | 2 + c/a | | |
| | EE231 | Electronic Instrumentation and Sensors | 5 | 1 | 1 | 2 + c/a | All BE Progs | |
| | MA2101 | Mathematics & Applied Mathematics I | 5 | 1 | 1 | 2 + c/a | All BE Progs | |
| | ME223 | Thermodynamics and Fluid Mechanics | 5 | 1 | 1 | 2 + c/a | 2BM, 2BSE, 2BE, 2BEE | |
| | ST1100 | Engineering Statistics | 5 | 1 | 1 | 2 + c/a | All BE Progs | |
| | BME200 | Introduction to Biomaterials | 5 | 2 | 2 | c/a | | |
| | BME2100 | Materials I | 5 | 2 | 2 | 2 + c/a | 2BM | |
| | MA2102 | Mathematics & Applied Mathematics II | 5 | 2 | 2 | 2 + c/a | All BE Progs | |
| | CE227 | Strength of Materials | 10 | Full Year | 2 | 2 + c/a | 2BM, 2BSE, 2BE, 2BCM | |
| | ME2105 | Manufacturing Technology & CAIRDE | 5 | Full Year | 2 | 2 + c/a | 2BM, 3BSE | |
| | ME2106 | Theory of Machines & CADD | 5 | Full Year | 1 | 2 + c/a | 2BM, 2BSE | |
| ***TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS*** | | | | | | | | |
| *Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a* | | | | | | | | |

| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester 1, 2, or Full Year* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(3BG1 – BE+ME pathway) Third University Examination in Engineering (Biomedical)** | | | | | | | | |
| | BME3132 | Finite Element Methods in Engineering I | 5 | 1 | 1 | 2 + c/a | 3BM | |
| | BME3134 | Biomedical Engineering Design I | 5 | 1 | 1 | 2 + c/a | MBM | |
| | BME328 | Principles of Biomaterials | 5 | 1 | 1 | Project | | |
| | ME301 | Fluid Dynamics | 5 | 1 | 1 | 2 + c/a | 3BM, 3BSE | |
| | ME304 | Mechanical Analysis and Design | 5 | 1 | 1 | 2 | 3BM, 3BSE, 4BEE | |
| | ME322 | Thermodynamics and Heat Transfer | 5 | 1 | 1 | 2 + c/a | 3BM, 3BG, 3BSE, 4BG | |
| | BME3133 | Biomedical Engineering Physiology | 5 | 2 | 2 | 2 + c/a | | |
| | BME3135 | Biomedical Engineering Design II | 5 | 2 | 2 | 2 + c/a | MBM | |
| | BME4101 | Biotransport | 5 | 2 | 2 | 2 + Project | 4BG, MBM, SPE | |
| | ME312 | Automated Systems | 5 | 2 | 2 | 2 + c/a | 3BM | |
| | ME353 | Quality Systems | 5 | 2 | 2 | 2 + c/a | 3BM | |
| | PA405 | Elements of Pathology | 5 | 2 | 2 | c/a | 4BG | |
| ***TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS*** *Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a; d/a indicates Departmental Assessment.* ****This module is a course requirement: It cannot be passed by compensation.*** | | | | | | | | |

| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester(s)* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(4BG1 – BE+ME pathway) BE Degree Examination (Biomedical)** | | | | | | | | |
| | BME400 | Biomechanics | 5 | 1 | 1 | 2 + c/a | 4BM, SPE, MBM | |
| | BME5104 | Finite Element Methods in Engineering II | 5 | 1 | 1 | 2+c/a | 4BM | |
| | ME4112 | Computational Fluid Dynamics | 5 | 1 | 1 | 2+c/a | 4BM | |
| | BME5101 | Mechanobiology | 5 | 1 | 1 | c/a | MBM | |
| | BME4109 | Medical Image Analysis & Modelling | 5 | 1 | 1 | 2 | | |
| | ME4109 | Materials II | 5 | 1 | 1 | 2 + c/a | 4BM | |
| | BME4107 | Biomedical Professional Experience Programme* | 20 | 2 | 2 | d/a | | |
| | ME3102 | Project Management for Engineers (online module) | 5 | 2 | 2 | c/a | 3BM | |
| | ME3104 | Intro to Regulatory Affairs in Manufacturing (online module) | 5 | 2 | 2 | c/a | 3BM | |
| *TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS*<br>*Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a; d/a indicates Departmental Assessment.****This module is a course requirement: It cannot be passed by compensation.*** | | | | | | | | |

| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester 1, 2, or Full Year* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(3BG4 – BE pathway) Third University Examination in Engineering (Biomedical)** | | | | | | | | |
| | BME3132 | Finite Element Methods in Engineering I | 5 | 1 | 1 | 2 + c/a | 3BM | |
| | BME3134 | Biomedical Engineering Design I | 5 | 1 | 1 | 2 + c/a | | |
| | BME328 | Principles of Biomaterials | 5 | 1 | 1 | Project | | |
| | ME301 | Fluid Dynamics | 5 | 1 | 1 | 2 + c/a | 3BM, 3BSE | |
| | ME304 | Mechanical Analysis and Design | 5 | 1 | 1 | 2 | 3BM, 3BSE, 4BEE | |
| | ME322 | Thermodynamics and Heat Transfer | 5 | 1 | 1 | 2 + c/a | 3BM, 3BG, 3BSE, 4BG | |
| | BME3133 | Biomedical Engineering Physiology | 5 | 2 | 2 | 2 + c/a | | |
| | BME3135 | Biomedical Engineering Design II | 5 | 2 | 2 | 2 + c/a | | |
| | ME3102 | Project Management for Engineers (online module) | 5 | 2 | 2 | c/a | 3BM, 3BSE, 3BLE, 3BP | |
| | ME3104 | Intro to Regulatory Affairs in Manufacturing (online module) | 5 | 2 | 2 | c/a | 3BM, MBM, 3HF2, MECE, MEEE, MEME | |
| | ME312 | Automated Systems | 5 | 2 | 2 | 2 + c/a | 3BM | |
| | ME353 | Quality Systems | 5 | 2 | 2 | 2 + c/a | 3BM | |
| ***TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS*** *Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a; d/a indicates Departmental Assessment.* ****This module is a course requirement: It cannot be passed by compensation.*** | | | | | | | | |

| *Requisite Type:* | *Module Code* | *Module Name* | *ECTS Credits* | *Taught in Semester(s)* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared With:* | *Bonded with:* |
|---|---|---|---|---|---|---|---|---|
| **(4BG4 – BE pathway) BE Degree Examination (Biomedical)** | | | | | | | | |
| | BME400 | Biomechanics | 5 | 1 | 1 | 2 + c/a | 4BM, SPE, MBM | |
| | BME5104 | Finite Element Methods in Engineering II | 5 | 1 | 1 | 2+c/a | 4BM | |
| | ME4112 | Computational Fluid Dynamics | 5 | 1 | 1 | 2+c/a | 4BM | |
| | ME4109 | Materials II | 5 | 1 | 1 | 2 + c/a | 4BM, 4BSE, MBM, MEME, MEC | |
| | BME4109 | Medical Image Analysis & Modelling | 5 | 1 | 1 | 2 | | |
| | BME4101 | Biotransport | 5 | 2 | 2 | 2 + Project | 3BG1, MEB, MBM, SPE | |
| | PA405 | Elements of Pathology | 5 | 2 | 2 | c/a | 3BG1 | |
| | BME4102 | Biomedical Engineering Project | 10 | Full Year | 2 | C/A | | |
| | BME502 | Advanced Tissue Engineering | 5 | 2 | 2 | c/a | MBM, MSR, MV | |
| | ME572 | Human Reliability | 5 | 2 | 2 | 2 + c/a | | IE444 |
| | BME4108 | Biomedical Professional Experience Programme 4 Year BE* | 5 | 2 | 2 | d/a | | |
| ***TOTAL FOR THE COMPUTATION OF HONOURS = 60 ECTS***<br>*Where there is no examination indicated it may be assumed that the examination is by continuous assessment = c/a; d/a indicates Departmental Assessment.****This module is a course requirement: It cannot be passed by compensation.*** | | | | | | | | |

# ME IN BIOMEDICAL ENGINEERING

## GENERAL SYLLABUS: For all entrants, including graduates of programmes other than the University of Galway BE in Biomedical Engineering

General Conditions:

Students must obtain approval of their module selection from the Programme Director.

Selection of modules may depend upon:

- Availability of the module in the academic year of study;
- Timetabling constraints with respect to other modules chosen;
- Completion of pre-requisite or co-requisite modules, or other required modules as identified by the Programme Director.

Students cannot take a module where they have already completed coursework of a similar content and standard.

| *Requisite: Prereq Coreq Exreq* | *Module Code* | *Module Name* | *ECTS* | *Taught in Semester 1, 2, or Full Year* | *Examined/ Submitted in Semester(s)* | *Duration of exam (hours)* | *Lectures Shared with:* | *Bonding* |
|---|---|---|---|---|---|---|---|---|
| **PROJECT/THESIS (25ECTS)** | | | | | | | | |
| | BME5109 | Biomedical Engineering BioInnovate project | 15 | Full Year | 2 | c/a | | |
| | BME5112 | Biomedical Engineering Individual Masters Project | 10 | Full Year | 2 | c/a | | |
| **Core Biomedical Engineering Modules (20ECTS)** | | | | | | | | |
| BME5104 | BME501 | Advanced Finite Element Methods | 5 | 2 | 2 | 2 + c/a | | |
| | BME502 | Advanced Tissue Engineering | 5 | 2 | 2 | 2 + c/a | | |
| | BME5111 | Advanced Biomedical Thermodynamics | 5 | 1 | 1 | 2+c/a | | |
| BME5104 | BME5100 | Advanced Computational Biomechanics | 5 | 1 | 1 | 2+c/a | | |
| **Optional Group 1 (choose 5-10ECTS)** | | | | | | | | |
| | ME516 | Advanced Mechanics of Materials | 5 | 2 | 2 | 2 + c/a | | |
| | ME5106 | Advanced Manufacturing | 5 | 2 | 2 | 2 + c/a | | |
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Optional Group 2 (chose 0-5ECTS)<br>** BME5104 is mandatory for those who have not taken a similar module | | | | | | | | |
| | BME5104 | **Finite Element Methods in Engineering II | 5 | 1 | 1 | 2 + c/a | | |
| | EE502 | Bioinstrumentation Design | 5 | 2 | 2 | 2 + c/a | | |
| | EE5121 | UX Design for Medical Devices | 5 | 1 | 1 | c/a | | |
| | MP410 | Non-Linear Elasticity | 5 | 1 | 1 | 2 + c/a | 2024-25<br>Modules run in alternate years | |
| | MP494 | Partial Differential Equations | 5 | 1 | 1 | 2 + c/a | 2025-26<br>Modules run in alternate years | |
| | MD507 | Stem Cells and Gene Therapy II | 5 | 2 | 2 | 2 | | |
| | REM502 | Translational Medicine | 5 | 2 | 2 | c/a | | |
| | CT5200 | Fundamentals of Python Programming | 5 | 1 | 1 | 2 + c/a | | |
| Optional Group 3 (choose 5ECTS) | | | | | | | | |
| | IE446 | Project Management | 5 | 1 | 1 | c/a | | |
| | IE450 | Lean Systems | 5 | 1 | 1 | 2 | | |
| | ME4105 | Safety Engineering | 5 | 1 | 1 | 2 | MEME, MSME, BM, APE | |
| CT5161 (or equivalent) | CT4101 | **Machine Learning | 5 | 1 | 1 | 2 + c/a | MEME, MECE | |
| | EE4104 | Machine Learning and Artificial Intelligence for Engineering Applications | 5 | 1 | 1 | CA | | |