MSc in Biomedical Engineering (90 ECTS)

The MSc in Biomedical Engineering is a full-time 90ECTS programme. Students entering on this programme must make module selections within one of the following three streams:

I. General Stream

II. Medical Electronics Stream

Further details on these streams are outline below. Within each of these, students <u>must</u> 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.

I. General Stream

All students <u>must</u> complete a research-based thesis worth 30ECTS. The remaining 60 ECTS are made up from taught mandatory foundational modules (35 ECTS) and choice technical (15 -20) ECTS) and transferrable skills modules (5-10 ECTS) as outlined below.

Pre-Req(s)	Module Code	Module Name	ECTS	Taught in Semester(s)	Examined in Semester	Duration of exam (hours)
		Thesis (Mandatory 30ECTS)				
	BME5102	Biomedical Engineering Thesis	30	Full Year	2	c/a
		Foundational Mandatory Modules (35 ECTS)				
	BME400	Biomechanics	5	1	1	2 + c/a
	BME405	Tissue Engineering	5	1	1	2 + c/a
	BME5101	Mechanobiology	5	1	1	2 + c/a
	BME5110	Finite Element Methods in Engineering – Theory and Practice	5	1	1	2 + c/a
	BME5105	Biomedical Engineering Design I	5	1	1	2
	BME3135	Biomedical Engineering Design II	5	2	2	2 + c/a

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	BME4101	Biotransport	5	2	2	2 + c/a
		Technical Elective Modules (Select 15-20 ECTS)				
BME5110	BME5100	Advanced Computational Biomechanics	5	1	1	2 + c/a
	BME5111	Advanced Biomedical Thermodynamics	5	1	1	2 + c/a
	BME500	Advanced Biomaterials	5	1	1	c/a
	ME4112	Computational Fluid Dynamics	5	1	1	2 + c/a
	EE4104	Machine Learning and Artificial Intelligence for Engineering Applications	5	1	1	2 +c/a
	CT4109	Image Processing & Computer Vision	5	1	1	2 + c/a
	EE5121	UX Design for Medical Devices	5	1	1	2 + c/a
	IE450	Lean Systems	5	1	1	2
	ME4109	Materials II	5	1	1	2 + c/a
	ST314	Introduction to Biostatistics	5	1	1	2 + c/a
	ME516	Advanced Mechanics of Materials	5	2	2	2+ c/a
	EE502	Bioinstrumentation Design	5	2	2	2 + c/a
BME5110	BME501	Advanced Finite Element Methods	5	2	2	2 + c/a
	BME502	Advanced Tissue Engineering	5	2	2	c/a
	MD507	Stem Cells and Gene Therapy II	5	2	2	2
	ME5106	Advanced Manufacturing	5	2	2	2 + c/a
	REM502	Translational Medicine	5	2	2	c/a
	REM508	Basic and Advanced Immunology	5	2	2	c/a
		Transferrable Skills Modules (Select 5-10 ECTS)				
	IE446	Project Management	5	1	1	c/a
	ME432	Technology, Innovation & Entrepreneurship	5	1	1	c/a
	ME521	Research Methods for Engineers	5	1	1	c/a
	ME572	Human Reliability	5	2	2	2 + c/a

II. Medical Electronics Stream						
All students <u>must</u> complete a research-based thesis worth 30ECTS. The remaining 60 ECTS must be chosen from taught modules from (i) Foundational, (ii) Technical Elective and (iii) Transferrable Skills module categories, according to the ECTS rules outlined below.						
Pre-Req(s)	Module Code	Module Name	ECTS	Taught in Semester(s)	Examined in Semester	Duration of exam (hours)
Thesis (Mandatory)						
	EE5105	Medical Electronics and Digital Health Project	30	Full Year	2	c/a
Foundational Modules (Select at least 25 ECTS)						
	EE445	Digital Signal Processing	5	1	1	2 + c/a
	EE502	Bioinstrumentation Design	5	2	2	2 + c/a
	EE5121	UX Design for Medical Devices	5	1	1	2 + c/a
	EE4104	Machine Learning and Artificial Intelligence for Engineering Applications	5	1	1	2 +c/a
	EE5127	Internet of Things Systems Design	5	1	1	2 + c/a
	EE551	Embedded Image Processing	5	2	2	c/a
	EE5105	Applied Circuit Design for Medical Electronics	5	2	2	2 + c/a
Technical Elective Modules (Select at least 25 ECTS)						
	BME400	Biomechanics	5	1	1	2 + c/a
	BME5100	Advanced Computational Biomechanics	5	1	1	2 + c/a
	BME5110	Finite Element Methods in Engineering – Theory and Practice	5	1	1	2 + c/a
	ME4109	Materials II	5	1	1	2 + c/a
	BME5105	Biomedical Engineering Design I	5	1	1	2 + c/a
	BME3135	Biomedical Engineering Design II	5	2	2	2 + c/a

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BME5110	BME501	Advanced Finite Element Methods	5	2	2	2 + c/a
	EE5104	Embedded Machine Vision	5	2	2	2 + c/a
	ME5106	Advanced Manufacturing	5	2	2	2 + c/a
Transferrable Skills Modules (Select at least 5 ECTS)						
	IE446	Project Management	5	1	1	c/a
	IE450	Lean Systems	5	1	1	2
	ME432	Technology, Innovation & Entrepreneurship	5	1	1	c/a
	ME521	Research Methods for Engineers	5	1	1	c/a
	ME572	Human Reliability	5	2	2	2 + c/a