

## 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. Biomechanics and Medical Devices Stream
- III. Medical Electronics Stream

Further details on these streams are outline below. Within each of these, 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.

### I. General Stream

All students must 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.

<i>Pre-Req(s)</i>	<i>Module Code</i>	<i>Module Name</i>	<i>ECTS</i>	<i>Taught in Semester(s)</i>	<i>Examined in Semester</i>	<i>Duration of exam (hours)</i>
<b>Thesis (Mandatory 30ECTS)</b>						
	BME5102	Biomedical Engineering Thesis	30	Full Year	2	c/a
<b>Foundational Modules (Select at least 20 ECTS)</b>						
	BME400	Biomechanics	5	1	1	2 + c/a
	BME405	Tissue Engineering	5	1	1	2 + c/a
	BME500	Advanced Biomaterials	5	1	1	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
	EE502	Bioinstrumentation Design	5	1	1	2+c/a
	BME5111	Advanced Biomedical Thermodynamics	5	1	1	2 + c/a

*\*BME5110 Finite Element Methods in Engineering – Theory and Practice is a mandatory module on General Stream and Biomechanics and Medical Devices Stream*

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	BME3135	Biomedical Engineering Design II	5	2	2	2 + c/a
<b>Technical Elective Modules (Select up to 35 ECTS)</b>						
	BME5105	Biomedical Engineering Design I	5	1	1	2
BME5110	BME5100	Advanced Computational Biomechanics	5	1	1	2 + c/a
	ME4112	Computational Fluid Dynamics	5	1	1	2 + c/a
	CT336	Graphics & Image Processing	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
	BME4101	Biotransport	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
<b>Transferrable Skills Modules (Select 5-10 ECTS)</b>						
	AY872	Financial Management I	5	1	1	2 + c/a
	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

*\*BME5110 Finite Element Methods in Engineering – Theory and Practice is a mandatory module on General Stream and Biomechanics and Medical Devices Stream*

## II. Biomechanics and Medical Devices Stream

All students must 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.

<i>Pre-Req(s)</i>	<i>Module Code</i>	<i>Module Name</i>	<i>ECTS</i>	<i>Taught in Semester(s)</i>	<i>Examined in Semester</i>	<i>Duration of exam (hours)</i>
<b>Thesis (Mandatory)</b>						
	BME5102	Biomedical Engineering Thesis	30	Full Year	2	c/a
<b>Foundational Modules (Select at least 20 ECTS)</b>						
	BME5110	Finite Element Methods in Engineering – Theory and Practice*	2	1	1	2 + c/a
	BME400	Biomechanics	5	1	1	2 + c/a
	BME5105	Biomedical Engineering Design I	5	1	1	2 + c/a
	BME5111	Advanced Biomedical Thermodynamics	5	1	1	2 + c/a
	BME4101	Biotransport	5	2	2	2 + c/a
	BME3135	Biomedical Engineering Design II	5	2	2	2 + c/a
BME5110	BME501	Advanced Finite Element Methods	5	2	2	2+ c/a
<b>Technical Elective Modules (Select up to 35 ECTS)</b>						
	BME405	Tissue Engineering	5	1	1	2 + c/a
	ME4112	Computational Fluid Dynamics	5	1	1	2 + c/a
	BME500	Advanced Biomaterials	5	1	1	c/a
BME5110	BME5100	Advanced Computational Biomechanics	5	1	1	2 + c/a
	BME5101	Mechanobiology	5	1	1	2 + c/a
	EE502	Bioinstrumentation Design	5	1	1	2 + c/a
	IE450	Lean Systems	5	1	1	2
	ME4109	Materials II	5	1	1	2 + c/a

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	ST314	Introduction to Biostatistics	5	1	1	2 + c/a
	ME516	Advanced Mechanics of Materials	5	2	2	2 + c/a
	BME502	Advanced Tissue Engineering	5	2	2	c/a
	EE5124	Bioinstrumentation Design II	5	2	2	2 + c/a
	ME5106	Advanced Manufacturing	5	2	2	2 + c/a
	REM502	Translational Medicine	5	2	2	c/a
<b>Transferrable Skills Modules (Select 5-10 ECTS)</b>						
	AY872	Financial Management I	5	1	1	2 + c/a
	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

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III. 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.						
<i>Pre-Req(s)</i>	<i>Module Code</i>	<i>Module Name</i>	<i>ECTS</i>	<i>Taught in Semester(s)</i>	<i>Examined in Semester</i>	<i>Duration of exam (hours)</i>
<b>Thesis (Mandatory)</b>						
	EE5125	Medical Electronics Thesis	30	Full Year	2	c/a
<b>Foundational Modules (Select at least 25 ECTS)</b>						
	EE445	Digital Signal Processing	5	1	1	2 + c/a
	EE502	Bioinstrumentation Design	5	1	1	2 + c/a
	EE5121	UX Design for Medical Devices	5	1	1	2 + c/a
	EE5116	Mobile Device Technologies	5	2	2	2 + c/a
Not running 2024-25	EE5124	Bioinstrumentation Design II	5	2	2	2 + c/a
	EE5127	Internet of Things Systems Design	5	2	2	2 + c/a
	EE551	Embedded Image Processing	5	2	2	c/a
<b>Technical Elective Modules (Select at least 25 ECTS)</b>						
	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

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	BME3135	Biomedical Engineering Design II	5	2	2	2 + c/a
BME5110	BME501	Advanced Finite Element Methods	5	2	2	2 + c/a
	ME5106	Advanced Manufacturing	5	2	2	2 + c/a
<b>Transferrable Skills Modules (Select at least 5 ECTS)</b>						
	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

*\*BME5110 Finite Element Methods in Engineering – Theory and Practice is a mandatory module on General Stream and Biomechanics and Medical Devices Stream*