

Master's Programme in Biomedical Engineering

The Master's Programme in Biomedical Engineering (BME) is a joint program organized by two faculties, Faculty of Information Technology and Electrical engineering (ITEE) and Faculty of Medicine (FMED). Studies include compulsory courses for all BME students, compulsory specialization studies based on the faculty (ITEE or FMED), and optional studies. The student executes compulsory studies 70-72 ECTS credits including master's thesis 30 ECTS and maturity test, studies of the selected specialization module 25 ECTS credits, and optional studies so that the total extent of the degree is a minimum of 120 ECTS credits. Studies are executed according to the personal study plan with individual timetable depending on the optional studies. Some of the courses are held only every second year.

Compulsory Studies 70-72 ECTS Credits

These are compulsory for all students of the BME Master's Programme. Studies include compulsory Master's thesis and Maturity test. Survival Finnish Course (2 ECTS credits) is mandatory for those who are not native Finnish speaking persons nor executed corresponding compensatory course earlier. Each student must prepare a personal study plan as a part of orientation.

Studies of the Selected Specialization Module 25 ECTS Credits

Compulsory studies of the selected option, (1) Signal and Image Processing in ITEE, and (2) Biomechanics and Imaging or (3) Health technology in FMED.

Optional Studies 23-25 ECTS Credits

Optional studies will be executed so that the total extent of the degree is at least 120 credits. Optional studies can be chosen from other modules or from other intermediate and advanced studies that support the degree. In the case of optional studies, if necessary, the student must agree with the organizing department for the participation for the course.

**Biomedical Engineering, Master of Science (Technology), Faculty of ITEE, or
Biomedical Engineering, Master of Health Science, Faculty of Medicine
120 ECTS Credits 2 years, Study Structure 2018-20**

Period	Code	Course Name	ECTS	1st autumn		1st spring		summer	2nd autumn		2nd spring	
				1	2	3	4		1	2	3	4
Biomedical Engineering Common Compulsory Studies 70-72 ECTS cr												
	521242A	Introduction to Biomedical Engineering	5	5								
	521149S 521467A	An Introduction to Computer Vision Methods for Biomedical Images (<u>non-Finnish students</u>) OR Digital Image Processing (<u>Finnish students</u>)	5	5								
	900017Y	Survival Finnish Course (<u>for non-Finnish students only</u>)	2	2								
	521273S	Biosignal Processing I	5		5							
	041201A	Basics in eHealth	5			5						
	080925A	Anatomy and Physiology for Biomedical Engineering	5				5					
	521027S 580121A	Advanced Practical Training (ITEE) OR Practical Training (FMED)	5					5				
	521284S 580202S	Biomedical Engineering Project (ITEE) OR Biomedical Engineering Project (FMED)	5-10						5	0		
	080928S	Biomedical Engineering Research Methods and Seminar	5						2.5	2.5		
	522987S 580213S	Master's Thesis in Biomedical Engineering (ITEE) OR Master's Thesis in Biomedical Engineering (FMED)	30							10	10	10
	521009S 580211S	Computer Science and Engineering, The Maturity Test for Master's Degree (ITEE) OR Maturity Test (FMED)	0									0
Compulsory Studies ITEE BME (Signal and Image Processing) 25 ECTS cr												
	521149S	Function and Analysis of Cardiovascular System	5		5							
	521289S	Machine Learning	5			5						
	521466S	Machine Vision	5			5						
	521282S	Biosignal Processing II	5				5					
	521285S	Affective Computing	5						5			
Compulsory Studies FMED BME (Biomechanics and Imaging) 25 ECTS cr												
	080915S	Tissue Biomechanics	5		5							
	080920S	Diagnostic Imaging	5		5							
	080921S	Biomedical Ultrasound	5			5						
	080916S	Biomechanics of Human Movement	5				5					
	080922S	Microscopy and Spectroscopic Imaging	5								5	
Compulsory Studies FMED BME (Health Technology) 25 ECTS cr												
	080929S	Health Technology and Multimodal Monitoring	5			5						
	521097S	Wireless Measurements	5			5						
	080916S	Biomechanics of Human Movement	5				5					
	521093S	Biomedical Instrumentation	5				5					

080927S	Connected Health and mHealth	5						5			
Recommended Optional Studies 23-25 ECTS cr, see separate section below											
Compulsory Studies in Total		12	5	10	10	5	7.5	12.5	10	10	
Optional Studies in Total		3	10	5	5		7.5	2.5	5	0	
Credits/period		15	15	15	15		15	15	15	10	
Credits/semester		30		30		5	30		25		
Credits/academic year		60				5	55				

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Recommended Optional Studies

Period	Code	Course Name	ECTS	1st autumn		1st spring		summer	2nd autumn		2nd spring	
				1	2	3	4		1	2	3	4
Recommended Optional Studies ITEE BME (Signal and Image Processing) 23-25 ECTS cr												
	521156S	Towards Data Mining	5	0					0			
	031025A	Introduction to Optimization	5	0					0			
	521348S	Statistical Signal Processing	5	0					0			
	521149S	Deep Learning	5		0					0		
	521279S	Signal Processing Systems	5		0					0		
	521161S	Multi-Modal Data Fusion	5		0					0		
	080920S	Diagnostic Imaging	5		0					0		
	521495A	Artificial Intelligence	5			0					0	
	521288S	Multiprocessor Programming	5			0	0				0	0
	080926A	Introduction to Biomedical Imaging Methods	1-3				0					0
	521093S	Biomedical Instrumentation	5				0					0
	521493S	Computer Graphics	5				0					0
	521283S	Big Data Processing and Applications	5				0					0
Recommended Optional Studies FMED BME (Biomechanics and Imaging) 23-25 ECTS cr												
	521156S	Towards Data Mining	5	0					0			
	761652S	NMR Imaging	10						0	0		
	080924S	Biomaterials	2-5		0					0		
	521240S	Biophotonics and Biomedical Optics	5		0					0		
	521149S	Deep Learning	5		0					0		
	521289S	Machine Learning	5			0					0	
	521466S	Machine Vision	5			0					0	
	521495A	Artificial Intelligence	5			0					0	
	080926A	Introduction to Biomedical Imaging Methods	1-3				0					0
	521093S	Biomedical Instrumentation	5				0					0
	080923S	Physics in Radiation Therapy	5				0					0
	080917S	Project in Biomedical Technology OR	5-10			0	0		0	0	0	0
	080918S	Project in Medical Imaging										
Recommended Optional Studies FMED BME (Health Technology) 23-25 ECTS cr												
	521156S	Towards Data Mining	5	0					0			
	464104A	Product Innovations	5	0					0			
	080915S	Tissue Biomechanics	5		0					0		
	521124S	Sensors and Measuring Techniques	5		0					0		
	521240S	Biophotonics and Biomedical Optics	5		0					0		
	521337A	Digital Filters	5			0					0	
	521289S	Machine Learning	5			0					0	
	521495A	Artificial Intelligence	5			0					0	
	521092A	Electronic Measurement Techniques	5				0					0
	521282S	Biosignal Processing II	5				0					0
	521283S	Big Data Processing and Applications	5				0					0
	080919S	Project in Health Technology	5-10			0	0	0	0	0	0	0