Metropolia UAS **Engineering 6.10.2022**	**Biotechnology and Chemical**	extent of credits	Strong engineering skills in mathematics and science	Good interaction skills	Skills to conduct projects	Clean and sustainable production technologies	Clean water production	Efficiency for using materials and energy	**Learning to learn**	**Ethics**	**Operating in a workplace**	**Sustainable development**	**Internationality and multiculturalism**	**Proactive development**
1st Year of study	**Orientation to Biotechnology and Chemical Engineering**	**30**												
	Orientation to Field and Studies	5		x					x	x	x			
	Fundamentals of Chemistry 1	5	x						x			x		
	Introductory Project and Professional Communication	5	x	x	x				x		x			
	Fundamentals of Chemistry 2	5	x						x					
	Fundamentals of Mathematics and Natural Sciences 1	5	x						x					
	Fundamentals of Mathematics and Natural Sciences 2	5	x						x					
	Introduction to the Industry	**30**												
	Math and Science Basics 3	5	x						x					
	Analytical and Organic Chemistry	5	x				x		x					
	The World of Microbes	5				x	x					x		
	Industrial Processes and Materials	5				x	x	x	x			x		
	Project Course in Biotechnology and Chemical Engineering	5				x	x	x	x			x		
	In total	60												
2nd Year of study	**Becoming an Expert in Biotechnology and Chemical Engineering**	**30**												
	Engineering Chemistry	5	x					x						
	Food Chemistry and Nutrition	5	x			x		x		x		x		
	Statistics and Design of experiments	5	x					x						
	Fluid mechanics and heat transfer basics	5	x		x	x	x	x	x			x		
	Basics of Materials technology	5	x					x				x		
	Engineering English and Communication Skills	5		x					x				x	
	Becoming an Engineer in Biotechnology and Chemical Engineering	**30**												
	Process Design Basics	5	x			x		x	x					
	Health, Safety and Environmental Responsibility	5	x			x	x	x		x		x		
	Industrial Business	5			x				x	x	x	x	x	
	Automation Technology	5	x				x							
	Process Operation Control and Maintenance	5	x			x	x	x		x		x		
	Engineering Swedish	5		x					x				x	
	Finnish as a Second Language: Finnish at Work	5		x					x				x	
	In total	60												
3rd Year of study	**Utilization of Biotechnology**	**15**												
	Enzymes and industry	5	x			x	x	x				x		
	DNA methods in analytics	5	x			x	x	x	x	x		x		
	Biotechnology and Gene Engineering Project	5	x	x	x	x			x	x	x	x		
	Bio and Food Processes	**15**												
	Introduction to Bio and Food Technology	5	x					x				x		
	Biotechnological processes	5	x			x		x				x		
	Food Processes and Analytics	5	x			x	x	x				x		
	Food Quality and Safety	**15**												
	Product Safety	5	x			x	x			x		x		
	Packaging and Logistics	5			x	x	x	x	x	x	x	x		
	Sensory evaluation	5		x	x			x	x		x			
	Products in the Future	**15**												
	Sustainable Product Development	5	x			x	x	x		x		x		
	Multidisciplinary Innovation Project	10	x	x	x		x	x	x		x	x	x	
	In total	60												
4th Year of study	**Bachelor's Thesis**	**15**												
	Bachelor's Thesis	15	x	x	x	x	x	x	x			x		
	Work Placement	**30**												
	Work Placement 1	15		x							x	x	x	
	Work Placement 2	15		x		x	x				x	x	x	
	Elective Studies	**15**												
	In total	60												