Metropolia UAS **Biotechnology and Chemical Engineering 29.1.2021**		extent of credits	Strong engineering skills in mathematics and science	Good interaction skills	Skills to conduct projects	Clean and sustainable production technologies	Know-how for circular economy and sustainable developmer	Clean water production	Efficiency for using materials and energy	**Learning competence**	**Ethical competence**	**Working community competence**	**Innovation competence**	**Multicultural competence**	**Technological competence**
1st Year of study	**Orientation to Field and Studies in Biotechnical, Chemical and Surface 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	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 Industrial Processes in Biotechnical, Chemical and Materials Engineering	**30**													
	Engineering Chemistry	5	x						x						x
	Math and Science Basics 3	5	x							x				x	
	Basics in Biosciences	5	x			x	x	x		x					x
	Food Chemistry and Nutrition	5	x			x	x	x	x	x					x
	Project Course in Biotechnology and Chemical Engineering	5				x	x	x	x	x					x
	In total	60													
2nd Year of study	**Properties of Biomaterials**	**30**													
	Sensory Evaluation	5		x	x				x	x		x	x		
	Biochemistry and Gene Technology	5	x							x	x		x		x
	Industrial Microbiology	5	x		x	x	x	x		x	x		x		x
	Statistics and Design of experiments	5	x		x					x	x	x	x		x
	Heat Transfer and Fluid Mechanics in Food Engineering	5	x		x	x	x	x	x	x			x		x
	Food Manufacturing 1	5			x	x	x	x	x	x	x		x		x
	Biotechnical and Food Processes	**30**													
	Fermentation Technology	5	x		x	x	x	x	x	x			x		x
	Food Manufacturing 2	5			x	x	x	x	x	x	x		x		x
	Food Product Development Project	5	x	x	x				x	x	x	x	x		x
	Bioprocess technology	5	x		x	x	x	x	x	x			x		x
	Process Hygiene Project	5	x	x	x	x	x	x		x	x	x	x		x
	Food packaging	5			x	x	x	x	x	x	x	x	x		x
	In total	60													
3rd Year of study	**Products, Quality and Safety**	**30**													
	Bioproducts	10	x		x	x	x	x	x	x	x	x	x		x
	HSEQ	5	x			x	x	x	x		x				x
	Multidisciplinary Innovation Project	5	x	x	x		x		x	x		x	x	x	x
	Process Planning Project	10	x	x	x	x	x	x	x	x			x		x
	Plant Design and Profitability Calculations	**15**													
	Current Topics in Biotechnology and Food Engineering	5	x	x	x		x		x	x	x		x	x	x
	Engineering Swedish	5		x						x				x	
	Industrial Business	5					x			x	x	x		x	x
	Finnish as a Second Language: Finnish at Work	5								x	x	x	x	x	x
	Elective Study Module	15													
	In total	60													
4th Year of study	**Bachelor's Thesis**	**15**													
	Bachelor's Thesis	15	x	x	x	x	x	x	x	x			x		x
	Work Placement	**30**													
	Work Placement 1	15		x			x					x	x	x	x
	Work Placement 2	15		x		x	x	x				x	x	x	x
	Elective Studies	**15**													
	In total	60													