Metropolia UAS Biotechnology and Technologies 31.1	d Chemical Engineering, Clean Production .2024						developmer								
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1st Year of study	Orientation to Biotechnology and Chemical	Ψ	0)		0)				ш		ш	>		_	
,	Engineering	30													
	Orientation to Field and Studies	5		х						х	х	х			
	Fundamentals of Chemistry 1	5	х				х			X					
	Introductory Project and Professional Communication	5	х	х	х					х		х	х		
	Engineering English and Communication Skills	5		х						х				х	
	Fundamentals of Engineering Mathematics	5	Χ							Χ					
	Fundamentals of Physics	5	Χ							Х					
	Introduction to the Industry	30													
	Functions and differentials	5	Χ							Χ				Х	
	The World of Microbes	5				Х	Х	Х							Х
	Fundamentals of Chemistry 2 From Raw Materials to Products	5	X				, ,		v	Х					,
	Analytical and Organic Chemistry	5 5	X				Х	v	Х	v					X
	Project Course in Biotechnology and Chemical	5	Х					Х		Х					Х
	Engineering	5				х	х	х	х	х					х
l l	In total	60				^	۸	^	^	^					
	Becoming an Expert in Biotechnology and Chemical														
Zna roar or orday	Engineering	30													
	Engineering Chemistry	5	Х						Х						х
	Basics of Python Programming	5	Х			Х	Х		Х		Х				
	Statistics and Design of experiments	5	Х						Х						
	Fluid mechanics and heat transfer basics	5	Χ		Χ	Χ	Χ	Χ	Χ	Χ			Х		Х
	Engineering Physics	5	Χ							Χ					
	Properties and Phenomena of Materials	5				Χ	Χ	Χ							Х
	Becoming an Engineer in Biotechnology and														
	Chemical Engineering	30													
	Process Design Basics	5	Χ			Χ			Χ	Χ					Х
	Health, Safety and Environmental Responsibility	5	Х			Χ	Х	Χ	Х		Χ				Х
	Industrial Business	5			Х		Х			Х	Х	Х		Х	Х
	Automation Technology	5	X			V		X	v		.,				X
	Process Operation Control and Maintenance Engineering Swedish	5 5	Х	х		Х		Х	Х	~	Х			v	Х
	Finnish as a Second Language: Finnish at Work	5		X						X				X X	
	In total	60		Λ.						Λ				Λ.	
3rd Year of study															
,	Sustainable Production Management	20													
	Modern Production Plant	5	х			х									х
	Ecological Management of Material and Energy Balances	5	Х			X	х	х	х						X
	Energy-efficient Production	5	х					х							Х
	Sustainable Production	5	Х			Х		Х	Х						Х
	Designing Future Processes	30													
	Physico-Chemical Processing of Renewable Raw Materials		Х			Х									
	Resource-efficient Design of a Modern Production Plant	5	Х			Х		Х							Х
	Mechanical Processing of Renewable Raw Materials and P		X			X		Х							
	Phenomena and Reactors in Biochemical and Chemical En Future Production Plant	_	X		V	X	V	v	v						X
	Processing of Bio-Based Materials	5 5	X X	х	Х	X X	Х	X X	Х	Х				Х	X
	Innovation Project	10	^	^		^		^		^				^	^
	Multidisciplinary Innovation Project	10	х	х	х		х	х	х	х		х	х	х	х
	In total	60	,,	*	•		,			-			*	•	- *
	Bachelor's Thesis	15													
,	Bachelor's Thesis	15	х	х	х	х	х	х	х	х			х		х
	Work Placement	30													
	Work Placement 1	15		х			х					х	х	х	х
	Work Placement 2	15		Х		х	х	Х				Х	Х	х	Х
	Elective Studies	15													
	In total	60													