2 Curriculum Bachelor Bioengineering

2.1 Semester overview

Semester CP	Fundamentals of Mathematics and Natural Sciences	Fundamentals of Scientific Engineering	Fundamentals of Process Engineering	Specialization/ Process Engineering	Specialization/ Project Work; Interdicliplinary Qualification; Thesis
1 27	Advanced Mathematics I (7) General Chemistry and Chemistry of Aqueous Solutions (6) Biology für Engineers (7) - Cell Biology - Biochemistry - Genetics Basic Pracital Course (2) - Generyl Chemistry	Engineering Mechanics: Statics (5)			
2 33	Advanced Mathematics II (7) Mathematical Modeling for Biochemical Engineering (4) Organic Chemistry (5) Biology für Engineers (2) - Microbiology	Design of Machines (7)	Introduction into Bioengineering (5)		Programming and Numeric Simulation Using MATLAB (3)
3 31	Advanced Mathematics III (7) Data Analysis (3) Basic Pracital Course (2) - Mikrobiology	Engineering Mechanics: Dynamics (5) Thermodynamics I (7)	Bioprocess Engineering (5)		Scientific Writing with LaTeX (2)
4 33		Thermodynamics II (7) Heat and Mass Transfer (7) Fluiddynamics (5) Control Engineering and System Dynamics (5)		Elective Module Bioprocess Engineering (including lab) I (9)	
5 28			Unit Operations: Two modules (2 X 6)	Elective Module Bioprocess Engineering (including lab) (9) Elective Module Process Engineering I (5)	Specialization/ Project Work (2)
6 28				Elective Module Process Engineering II (5)	Specialization/ Project Work (10) Interdiciplinary Qualification (1) Thesis (12)

Numbers in brackets: Credits Points (CP)

Elective Module Bioprocess Engineering I and II: Lecture/ written exam (6 LP), lab one week (3 LP), the following modules can be chosen:

- Intensification of Bioprocesses
- Food Bioprocess Engineering
- Biopharmaceutical Process Engineering
- Microsystems in Bioprocess Engineering

2.2 Overview: Fields and Modules

Area	Module	Responsible	SWS	CP
Fundamentals of Mathematics and Natural Sciences 52 CP	Advanced Mathematics I	Griesmaier	6	7
	Advanced Mathematics II	Griesmaier	6	7
	Advanced Mathematics III	Griesmaier	6	7
	Mathematical Modeling for Biochemical Engineering	Thäter	2	4
	Data Analysis	Guthausen	2	3
	General Chemistry/ Chemistry of Aq. Solutions	Horn	5	6
	Organic Chemistry	Meier	4	5
	Biology for Engineers	Holtmann	8	9
	Basic Practical Course	Abbt-Braun, Horn, Neumann	2	4
Fundamentals of Scientific Engineering 48 CP	Engineering Mechanics: Statics	Willenbacher	4	5
	Engineering Mechanics: Dynamics	Dittmeyer	4	5
	Design of Machines	Nirschl	6	7
	Control Engineering and System Dynamics	Meurer	4	5
	Thermodynamics I	Enders	5	7
	Thermodynamics II	Enders	5	7
	Fluiddynamics	Nirschl	4	5
	Heat and Mass Transfer	Wetzel	5	7
Fundamentals of Process Engineering 22 LP	Introduction into Bioengineering	Grünberger	4	5
	Bioprocess Engineering	Grünberger	4	5
	Two oft he following modules:			
	- Mechanical Processing	Dittler	4	6
	- Thermal Process Engineering	Kind	4	6
	- Chemical Process Engineering	Wehinger	4	6
Specialization/ Process Engineering 28 LP	Elective Module Bioprocess Engineering I		4 + P	9
	Elective Module Bioprocess Engineering II		4 + P	9
	Elective Module Process Engineering I		4	5 (6)
	Elective Module Process Engineering I		4	5 (4)
Interdicliplinary Qualification 6 LP	Programming and Numeric Simulation Using MATLAB	Meurer	2	3
	Scientific Writing with LaTeX			2
	Elective module			1
Specialization/ Project Work 12 LP	1 module			12
12 LP	Thesis			12
Total				180

CP: Credit Points (ECTS),   SWS: weekly teaching hours

2.3 Lectures/ Exercises/ Laboratories/ exams
(Semester Overview, Attendance Timehours per week)

	1. Semester (WS)					2. Semester (SS)				
	V	Ü	P	LP	E	V	Ü	P	LP	E
Advanced Mathematics I and II	4	2	-	7	S+K	4	2	-	7	S+K
Mathematical Modeling for Biochemical Engineering	-	-	-	-	-	2	1		4	A
Engineering Mechanics: Statics	2	2	-	5	K	-	-	-	-	-
Design of Machines	-	-	-	-	-	3	2	-	7	S+K
General Chemistry and Chemistry in Aqu. Solutions	3	2	-	6	K		-	-	-	-
Organic Chemistry	-	-	-	-	-	2	2	-	5	K
Biology for Engineers – Cell Biology	2	-	-	2	K	-	-	-	-	-
Biology for Engineers - Biochemistry	2	-	-	2,5	K	-	-	-	-	-
Biology for Engineers - Mikrobiology	2	-	-	2,5	K	-	-	-	-	-
Biology for Engineers – Genetcs	-	-	-	-	-	2	-	-	2	K
Introduction into Bioengineering	-	-	-	-	-	4	0	-	5	K
Basic Practical Course in Natural Sciences	-	-	2	2	S	-	-	-	-	-
Programming and Numeric Simulation Using MATLAB	-	-	-	-	-	1	1	-	3	S
Total credit points/ Number of graded exams				*29*	*6*				*33*	*6*

	3. Semester (WS)					4. Semester (SS)				
	V	Ü	P	LP	E	V	Ü	P	LP	E
Advanced Mathematics III	4	2	-	7	S+K	-	-	-	-	-
Data Analysis	1	1	-	3	A	-	-	-	-	-
Engineering Mechanics: Dynamics	2	2	-	5	S+K	-	-	-	-	-
Control Engineering and System Dynamics	-	-	-	-	-	2	2	-	5	K
Fluiddynamics	-	-	-	-	-	2	2	-	5	S+K
Thermodynamics I and II	3	2	-	7	S+K	3	2	-	7	S+K
Heat and Mass Transfer	-	-	-	-	-	3	2	-	7	K
Bioprocess Engineering	2	2	-	5	K	-	-	-	-	-
Basic Practical Course in Natural Sciences	-	-	2	2	S	-	-	-	-	-
Elective Module Bioprocess Engineering I	-	-	-	-	-	2	2	2	9	K+P
Scientific Writing with LaTeX	1	1	-	2	S					
Total credit points/ Number of graded exams				*29*	*5*				*33*	*6*

	5. Semester (WS)					6. Semester (SS)				
	V	Ü	P	LP	E	V	Ü	P	LP	E
Chemical/ Thermal/ Mechanical Process Engineering	2	2	-	6	K	-	-	-	-	-
Chemical/ Thermal/ Mechanical Process Engineering	2	2	-	6	K	-	-	-	-	-
Eletive Module Bioprocess Engineering II	2	2	2	9	K+P	-	-	-	-	-
Elective Module Process Engineering	2	2	-	5	K	2	2	-	5	K
Specialized Subject/ Project Work	1	1	-	2	-	1	1	P	10	A+M
Interdisciplinary Qualification	-	-	-	-	-	1	-	-	1	S
Thesis	-	-	-	-	-	360 Stunden			12	A
Total credit points/ Number of graded exams				*28*	*5*				*28*	*4*

WS: Winter term
SS: Summer term
V: Lecture
Ü: Exercies
P: Lab
CP: Credit Points (ECTS)
E: Exam
K: Written Exam
M: Oral Exam
A: Examination of another type/ thesis
S: Completed Coursework (ungraded)