

**These degree programme and examination regulations have been worded carefully to be up to date; however, errors cannot be completely excluded. The official German text available at the Examinations Office is the version that is legally binding.**

**Note:** For students who started their studies before the latest amendment came into effect: please also note the previous amendments with their transitory provisions.

**Degree Programme and Examination Regulations  
for the Bachelor's and Master's Degree Programme  
Chemical and Biological Engineering  
at the Faculty of Engineering  
of the University of Erlangen-Nürnberg  
including Campus Busan (FPOCBI)  
Dated 05 December 2008**

amended by statutes of  
02 December 2009  
06 May 2010  
07 July 2010  
07 June 2011  
30 July 2012  
31 July 2012

Based on Section 13 (1)(2), Section 43 (5)(2), Section 61 (2)(1) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG) in conjunction with Section 57 QualV (Qualification Regulations for Studies at Public Universities in Bavaria), the University of Erlangen-Nürnberg enacts the following examination regulations:

**Part I: General Conditions**

**Section 35 Scope**

<sup>1</sup>The degree programme and examination regulations cover examinations for the Bachelor's and Master's degree programme in Chemical and Biological Engineering.

<sup>2</sup>They complement the General Examination Regulations for the Bachelor's and Master's Degree Programmes of the Faculty of Engineering at the University of Erlangen-Nürnberg as amended from time to time.

**Section 36 Bachelor's Degree Programme, Standard Duration of Studies and Language**

(1) The standard duration of studies for the Bachelor's degree Chemical and Biological Engineering shall be six semesters, including the period for the Bachelor's thesis and six weeks of industrial internship.

(2) <sup>1</sup>The language of instruction and examination for the Bachelor's degree programme shall generally be German. <sup>2</sup>Deviations from this shall be subject to the Examination Committee's approval.

## **Section 37 Master's Degree Programme, Standard Duration of Studies and Language**

(1) The Master's degree programme in Chemical and Biological Engineering shall include a three weeks' project development course, seven weeks' industrial internship and a period for the Master's thesis.

(2) The standard duration of studies for the Master's degree programme Chemical and Biological Engineering shall be four semesters.

(3) <sup>1</sup>The language of instruction for the Master's degree programme shall be German and/or English. <sup>2</sup>The examination language for written examinations and coursework shall be German or English, and, in exceptional cases, bilingual. <sup>3</sup>For oral examinations, students may choose between German and English as the examination language.

## **Part II: Special Provisions**

### **1. Bachelor's Examination**

#### **Section 38 Scope of the Preliminary Examination (Grundlagen- und Orientierungsprüfung)**

(1) The preliminary examination (Grundlagen und Orientierungsprüfung, GOP) shall consist of the modules set forth in **Appendix 1**

1. B1: Mathematics for CB11
2. B2: Mathematics for CB12
3. B5: General and Inorganic Chemistry
4. B14: Experimental Physics
5. B15: Metrology and Instrumental Analysis
6. B17: Introduction to Thermofluid Dynamics

<sup>2</sup>The ECTS credits allocated to each module and the type and scope of the examinations are stipulated in **Appendix 1**.

(2) The preliminary examination shall have been passed if at least 30 ECTS credits (from a total of 40 ECTS credits) have been earned from the modules listed in Paragraph 1.

#### **Section 39 Scope and Structure of the Bachelor's Examination**

(1) The Bachelor's examination shall consist of:

1. The examinations of the preliminary examination according to Section 38 (1)
2. The module examinations
  - a) B3: Mathematics for CB13
  - b) B4: Computational Techniques in Process Engineering 1 and 2
  - c) B6: Organic Chemistry
  - d) B7: Physical Chemistry
  - e) B8: Chemical Thermodynamics
  - f) B9: Biochemistry 1 and 2
  - g) B10: Microbiology
  - h) B11: Process Automation
  - i) B12: Materials Science
  - j) B13: Biochemical Practical
  - k) B16: Chemical and Biological Process Technology with Introductory Project

- l) B18: Heat and Mass Transfer
  - m) B19: Statics and Mechanics of Materials
  - n) B20: Machine Design
  - o) B21: Technical Drawing
  - p) B22: Interfaces in Process Engineering
  - q) B23: Bioreaction and Bioprocess Engineering
  - r) B24: Particle Technology
  - s) B25: Process Machinery and Plant Technology
  - t) B26: Reaction Engineering
  - u) B27: Fluid Mechanics
  - v) B28: Technical Thermodynamics
  - w) B29: Separation Processes
  - x) B30: Elective compulsory module
3. B31: Industrial Internship
4. Bachelor's thesis (Module B32)

(2) The duration of examinations and the type of examination (written or oral) for the modules are set out in **Appendix 1**.

(3) The elective compulsory module B30 shall be chosen from the catalogue in **Appendix 2**.

(4) The industrial internship (six weeks) shall fulfil the guidelines for work experience in Chemical and Biological Engineering.

#### **Section 40 Bachelor's Thesis**

(1) <sup>1</sup>The Bachelor's thesis enables students to learn to solve problems independently in the field of chemical and biological engineering. <sup>2</sup>The tasks and objectives of the thesis project shall be such that it can be completed with a workload of approximately 360 hours. <sup>3</sup>The results of the Bachelor's thesis shall be presented in a presentation with a maximum length of 30 minutes followed by a discussion. <sup>4</sup>The date of the presentation shall be determined by the supervising lecturer either after the student has submitted their Bachelor's thesis or during the final stage of thesis work. <sup>5</sup>12 ECTS credits shall be awarded for the Bachelor's thesis and 3 ECTS credits shall be awarded for the presentation.

(2) The subject of the Bachelor's thesis shall be allocated by a full-time university lecturer teaching Chemical and Biological Engineering at the Faculty of Engineering

(3) The Bachelor's thesis shall be written in German or English.

## **2. Master's Degree Programme**

### **Section 41 Qualification for a Master's Degree Programme, Certificates and Admission Requirements**

(1) <sup>1</sup>A subject-specific degree within the context of Section 29 (1)(1) AB-MPO/TechFak shall be a Bachelor's degree in chemical and biological engineering that is equivalent according to these examination regulations. <sup>2</sup>Applicants with a subject-related degree or a non-equivalent degree shall only be admitted to the Master's degree programme after passing an oral admission examination according to Paragraph 3.

(2) Applicants shall be deemed as qualified for the Master's degree programme in Chemical and Biological Engineering at the Faculty of Engineering of the University of Erlangen-Nürnberg according to Appendix 1, Paragraph 5 (2)(2) ABMPO/TechFak if they have passed at least four of the modules B23 to B29 of the Bachelor's degree programme with an average module grade of 3.0 or better.

(3) In the oral admission examination according to Appendix Paragraph 5 (3) ff. ABMPO/TechFak, applicants shall be evaluated according to the following criteria:

- knowledge of the foundations of the subject
- knowledge of a field of specialisation corresponding to an eligible specialisation in the Master's degree programme
- motivation to complete a Master's degree programme
- prognosis based on improving performance over the course of the studies so far

#### **Section 42 Master's Examination, Admission Requirements for the Master's Thesis**

(1) In order to commence with the Master's thesis (Module **M16** in **Appendix 3**), students shall be required to:

1. pass the specialization modules **M1** to **M4** in **Appendix 3** according to **Appendix 4.1**
2. pass the elective modules **M5** to **M9** in **Appendix 3**
3. complete the coursework in the supplementary modules **M10** to **M13** in **Appendix 3** according to **Appendix 4.2** and module **M14** (Project Development Course) in **Appendix 3** 'mit Erfolg' (pass)
4. submit proof of a total of seven weeks' industrial internship recognised by the Work Placement Office (Praktikumsamt) according to the work experience guidelines (module **M15** in **Appendix 3**)

(2) <sup>1</sup>The elective modules (M5 to M9) shall be chosen from the relevant module catalogue, which shall be published according to local practice at the beginning of every semester. <sup>2</sup>A special catalogue of elective modules shall apply to Campus Busan; it shall be announced according to local practice at the beginning of every semester. <sup>3</sup>The remaining specialization and supplementary modules may also fulfil the function of further elective modules. <sup>4</sup>Other elective modules which fit into the context of the degree programme may be approved by the Examinations Committee upon the student's request.

#### **Section 43 Master's Thesis**

(1) <sup>1</sup>The topic of the Master's thesis shall be allocated by a full-time university lecturer teaching Chemical and Biological Engineering at the Faculty of Engineering  
<sup>2</sup>Deviations from this shall be subject to the Examination Committee's approval.

(2) <sup>1</sup>The results of the Master's thesis shall be presented in a presentation with a maximum length of 30 minutes followed by a discussion. <sup>2</sup>The date of the presentation shall be determined by the supervising lecturer either after the student has submitted their Master's thesis or during the final stage of thesis work. <sup>3</sup>27 ECTS credits shall be awarded for the thesis and 3 ECTS credits shall be awarded for the presentation.

(3) The Master's thesis shall be written in German or English.

### **Section 44 Degree Certificate**

The degree certificate shall list modules M1 to M14 and module M16 with:

1. The examination subjects of the Master's examination according to Section 42 (1)(1) and (1)(2)
2. The chosen supplementary modules according to Section 42 (1)(3) (no grade; rating: 'mit Erfolg'/pass)
3. The subject of the project development course (no grade; rating: 'mit Erfolg'/pass)
4. The title of the Master's thesis and the corresponding grades.

### **III. Transitory and Final Provisions**

#### **Section 45 Legal Validity and Transitory Provisions**

(1) <sup>1</sup>These degree programme regulations shall come into effect on the day after their publication. <sup>2</sup>They shall apply to all students who enter the degree programme in the winter semester 2008/2009 or later.

(2) <sup>1</sup>All students studying a Diplom, Bachelor's or Master's degree programme in Chemical and Biological Engineering at the University of Erlangen-Nürnberg in the winter semester 2008/09 shall complete their studies under the Degree Programme and Examination Regulations for the Diplom Degree Programme Chemical and Biological Engineering (FPOCBI-Diplom) from 17 November 2004 or the Degree Programme and Examination Regulations for the Bachelor's and Master's Degree Programme Chemical and Biological Engineering (FPOCBI) from 01 February 2005.

(3) <sup>1</sup>The Preliminary (Vordiplom) and Diplom examinations for students of the Diplom degree programme shall be held for the last time in the following examination periods:

1. Preliminary examination after the summer semester 2010
2. Diplom examination after the summer semester 2014

<sup>2</sup>The Bachelor's examination for the students studying under FPOCBI from 01 February 2005 shall be held for the last time at the beginning of the lecture period of the summer semester 2013. <sup>3</sup>The last Master's examination for the students who started the degree programme before these degree programme and examination regulations came into effect shall be held at the beginning of the lecture period of the summer semester 2011. <sup>4</sup>Examinations after these examination periods shall be conducted according to these degree programme and examination regulations.

(4) At the same time as these degree programme and examination regulations come into effect, subject to the provision in Paragraph 2, the Degree Programme and Examination Regulations for the Diplom, Bachelor's and Master's Degree Programme Chemical Engineering at the Faculty of Engineering of the University of Erlangen-Nürnberg (FPOCIW) from 1 December 1998 (KWMBI 1999 II, p. 190), amended by statute from 13 July 1999 (KWMBI II, p. 882) and the Degree Programme and Examination Regulations for the Bachelor's and Master's Degree Programme Chemical and Biological Engineering (FPOCBI) from 1 February 2005 shall cease to be in force.

**Appendix 1:** Bachelor's degree programme modules with ECTS credits, semester distribution, and type and duration of the examination (continued on next page)

No.	Module		SWS (hours per week)			ECTS credits	1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.	3 <sup>rd</sup> sem.	4 <sup>th</sup> sem.	5 <sup>th</sup> sem.	6 <sup>th</sup> sem.	Examination duration in min.		
			L	T	P		ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	written	oral	
B1	Mathematics for CBI1 <sup>1)</sup>	Preliminary Examination (GOP)	4			7.5	7.5						90		
	Tutorial			2											*)
B2	Mathematics for CBI2 <sup>1)</sup>	Preliminary Examination (GOP)	4			7.5		7.5					90		
	Tutorial			2											*)
B3	Mathematics for CBI3 <sup>1)</sup>		4			7.5			7.5				90		
	Tutorial			2											*)
B4	Computational Techniques in Process Engineering 1		1	1	1	7.5	2.5						90		
	Computational Techniques in Process Engineering 1		2	1	1			5						90	
B5	General and Inorganic Chemistry	Preliminary Examination (GOP)	4			7.5	5						180		
	Practical				2									*)	
	Practical Introduction		1				2.5								
B6	Organic Chemistry		4	1		7.5			5				180		
	Practical				3				2.5					*)	
B7	Physical Chemistry		2	1		10		5					90		
	Practical				6				2.5	2.5				*)	
B8	Chemical Thermodynamics		2	1		5			5				90		
B9	Biochemistry 1		2			5			2.5				60		
	Biochemistry 2		2						2.5					60	
B10	Microbiology		3			2.5		2.5					90		
B11	Process Automation		2	1		2.5				2.5			*)		
B12	Materials Science		2			2.5		2.5					*)		
B13	Biochemical Practical				3	2.5			2.5				*)		
B14	Experimental Physics	Preliminary	4	1		7.5	7.5						120		

No.	Module	SWS (hours per week)			ECTS credits	1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.	3 <sup>rd</sup> sem.	4 <sup>th</sup> sem.	5 <sup>th</sup> sem.	6 <sup>th</sup> sem.	Examination duration in min.	
		L	T	P		ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	written	oral
		Examination (GOP)											

<sup>1)</sup> The equivalency of the Mathematics modules in the degree programmes of the Faculty of Engineering shall be announced according to local practice.

\*) : pass/fail coursework

B15	Metrology and Instrumental Analysis	Preliminary Examination (GOP)	2	1	2	5		5					*)	
B16	Chemical and Biological Process Technology with Introductory Project		2		3	5		5					*)	
B17	Introduction to Thermofluid Dynamics	Preliminary Examination (GOP)	3	2		5	5						*)	
B18	Heat and Mass Transfer		2	1		2.5			2.5				*)	
B19	Statics and Mechanics of Materials		3	2		7.5		7.5					90	
B20	Plant Design		2	1		5			5				120	
B21	Technical Drawing			3		2.5	2.5						*)	
B22	Interfaces in Process Engineering		2	1		2.5			2.5				*)	
B23	Bioreaction and Bioprocess Engineering		2	1		5				5				30
	Practical			1									*)	
B24	Particle Technology		2	1		5				5			120	
	Practical			1									*)	
B25	Process Machinery and Plant Technology		2	1		5					5		120	
	Practical			1									*)	
B26	Reaction Engineering		2	1		5					5		120	
	Practical			1									*)	
B27	Fluid Mechanics		2	1		5			5				120	
	Practical			1									*)	
B28	Technical Thermodynamics		2	1		5				5			120	
	Practical			1									*)	
B29	Separation Processes		2	1		5				5			120	
	Practical			1									*)	
B30	Elective module		2	1		5					5		see Appen-	

No.	Module	SWS (hours per week)			ECTS credits	1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.	3 <sup>rd</sup> sem.	4 <sup>th</sup> sem.	5 <sup>th</sup> sem.	6 <sup>th</sup> sem.	Examination duration in min.	
		L	T	P		ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	ECTS credits	written
												dix 2	
	Practical			1								*)	
B31	Industrial Internship (6 weeks)				7.5					7.5			
B32	Bachelor's thesis				15						12		
	Presentation										3		
	Total SWS (semester hours)		76	31	29								
	Total ECTS credit	40			180	30	32.5	27.5	30	30	30		

<sup>1)</sup> The equivalency of the Mathematics modules in the degree programmes of the Faculty of Engineering shall be announced according to local practice.

\*) : pass/fail coursework



**Appendix 2:** Elective modules of the Bachelor's degree programme

Elective module	Duration of written examination
Medical Biotechnology	120
Energy Technology	90
Sustainable Chemical Technologies – Processes	90

**Appendix 3:** Master's degree programme modules with ECTS credits, semester distribution and examination type. The hours per week (SWS) listed are approximate values.

No.	Module	SWS			ECTS credits	1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.	3 <sup>rd</sup> sem.	4 <sup>th</sup> sem.	Examination duration in min.
		L	T	P		ECTS credits	ECTS credits	ECTS credits	ECTS credits	
M1	1. Specialization module	3	1		7.5	5				120 or 30 **)
	Practical			3		2.5				*)
M2	2. Specialization module	3	1		7.5	5				120 or 30 **)
	Practical			3		2.5				*)
M3	3. Specialization module	3	1		7.5		5			120 or 30 **)
	Practical			3			2.5			*)
M4	4. Specialization module	3	1		7.5		5			120 or 30 **)
	Practical			3			2.5			*)
M5	1. Elective module	2	1		5	5				120 or 30 **)
M6	2. Elective module	2	1		5	5				120 or 30 **)
M7	3. Elective module	2	1		5		5			120 or 30 **)
M8	4. Elective module	2	1		7.5			5		120 or 30 **)
	Practical			3				2.5		*)
M9	5. Elective module	2	1		7.5			5		120 or 30 **)
	Practical			3				2.5		*)

No.	Module	SWS			ECTS credits	1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.	3 <sup>rd</sup> sem.	4 <sup>th</sup> sem.	Examination duration in min.
		L	T	P		ECTS credits	ECTS credits	ECTS credits	ECTS credits	
M10	1. Supplementary module	2	1		5	5				*)
M11	2. Supplementary module	2	1		5		5			*)
M12	3. Supplementary module	2	1		5			5		*)
M13	4. Supplementary module	2	1		5			5		*)
M14	Project development course	workload approx. 150 h			5		5			*)
M15	Industrial Internship	7 weeks			5			5		
M16	Master's thesis	workload approx. 900 h			30				27	
	Presentation								3	
	Total SWS (hours per week)	30	13	18						
	Total ECTS credits				120	30	30	30	30	

\*) pass/fail coursework, e.g. in the form of an examination, a presentation or term paper

\*\*) usually oral examinations. If there are more than 20 examinees, the examination may be conducted in written form with a duration of 120 minutes. The examination type shall be announced according to local practice by the end of the second week of the lecture period and the Examinations Office shall be notified. This specification shall be binding.

**Appendix 4:** Specialization and supplementary modules for the Master's degree programme

4.1 Specialization modules

a) Specialization module requirements

1. Specialization module on the topic of one of the modules B4 and B23 to B29 of the Bachelor's degree programme
2. Specialization module on the topic of one of the modules B4 and B23 to B29 of the Bachelor's degree programme
3. Specialization module on the topic of one of the modules B4 and B23 to B29 of the Bachelor's degree programme
4. Specialization module on the topic of one of the modules B4 and B23 to B29 of the Bachelor's degree programme

b) Specialization module catalogue

Bachelor's degree module	Master's degree specialization module
Computational Techniques in Process Engineering 1 and 2	Simulation of Granular and Molecular Systems
Bioreaction and Bioprocess Engineering	Bioreaction and Bioprocess Engineering (Specialization: Animal Cell Technology)
	Bioreaction and Bioprocess Engineering (Specialization: Marine Biotechnology)
	Bioreaction and Bioprocess Engineering (Specialization Microbial Process Engineering)
	Biological and Environmental Process Engineering (only at Campus Busan)
Particle Technology	Product Engineering (Specialization)
Process Machinery and Plant Technology	Process Machinery and Plant Technology (Specialization; only at FAU in Erlangen)
Chemical Reaction Engineering	Chemical Reaction Engineering (Specialization)
Fluid Mechanics	Fluid Mechanics (Specialization)
Technical Thermodynamics	Technical Thermodynamics (Specialization)

#### 4.2 Supplementary modules

Environmental Process Engineering

Process Machine Design (only at FAU in Erlangen)

Application of Numerical Techniques in Separation Technology (only at FAU in Erlangen)

Seminar: Energy Management (only at FAU in Erlangen)

Plant Development (only at FAU in Erlangen)

Production Processes (only at FAU in Erlangen)

Foundations of Electrical Engineering (only at FAU in Erlangen)

Management Practice (only at FAU in Erlangen)

Food Technology (only at Campus Busan)

Design and Analysis of Experiments (only at Campus Busan)

Chemical Production Processes (only at Campus Busan)

Numerical Fluid Mechanics (only at Campus Busan)