

These 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.

**Degree Programme and Examination Regulations for the  
Elite Master's Degree Programme  
Advanced Signal Processing & Communications  
Engineering (ASC) – FPOASC –  
at the Faculty of Engineering of  
Friedrich-Alexander-Universität Erlangen-Nürnberg  
Dated 29 February 2016**

Based on Section 13 (1)(2), Section 43 (5), Section 61 (2)(1) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG), Friedrich-Alexander-Universität Erlangen-Nürnberg enacts the following examination regulations:

Part 1: General Conditions .....	1
Preamble 1	
Section 34 Scope .....	1
Section 35 Standard Duration of Studies, ECTS Credits, Programme Start.....	2
Section 36 Degree.....	2
Section 37 Teaching and Examination Language.....	2
Section 38 Admissions Committee .....	2
Section 39 Qualification for the Elite Master's Degree Programme.....	2
Section 40 Structure of the Elite Master's Degree Programme .....	3
Section 41 Study Plan .....	3
Section 42 Examination and Coursework Achievements .....	3
Section 43 Research Projects .....	3
Section 44 Admission to the Master's Thesis.....	3
Section 45 Master's Thesis.....	4
Section 46 Evaluation of Achievements for the Master's Degree Programme,.....	4
Resit Examinations .....	4
Part 2: Concluding Provisions.....	4
Section 47 Legal Validity and Transitory Provisions .....	4
Appendix 1a: Study Plan for the Master's Degree Programme ASC.....	5
Appendix 1b: Catalogue of Technical Mandatory Electives for the Master's Degree Programme ASC <sup>1</sup> .....	6
Appendix 2: Qualification Assessment Process .....	7

## **Part 1: General Conditions**

### **Preamble**

Friedrich-Alexander-Universität Erlangen-Nürnberg offers an Elite Master's degree programme in Advanced Signal Processing & Communications Engineering (ASC) as part of the Elite Network of Bavaria.

### **Section 34 Scope**

The degree programme and examination regulations for the Elite Master's degree programme in Advanced Signal Processing & Communications Engineering (ASC) complement the current version of the General Examination Regulations for the Bachelor's

and Master's degree programmes at the Faculty of Engineering of Friedrich-Alexander-Universität Erlangen-Nürnberg (**ABMPO/TechFak**) from 18 September 2007.

### **Section 35 Standard Duration of Studies, ECTS Credits, Programme Start**

<sup>1</sup>120 ECTS credits shall be required in order to pass the Elite Master's degree programme in Advanced Signal Processing & Communications Engineering. <sup>2</sup>The standard duration of studies shall be four semesters. <sup>3</sup>The Master's degree programme may only be started in the winter semester.

### **Section 36 Degree**

<sup>1</sup>The student is conferred the degree Master of Science (abbreviated MSc) after passing the Master's examination. <sup>2</sup>The degree may also be used with the addition '(FAU Erlangen-Nürnberg)'.  
<sup>3</sup>The Master's thesis shall be written in English.

### **Section 37 Teaching and Examination Language**

<sup>1</sup>The teaching and examination language of the degree programme in Advanced Signal Processing & Communications Engineering is English. <sup>2</sup>However, if agreed beforehand between examinee and examiner, oral examinations may also be conducted in German. <sup>3</sup>The Master's thesis shall be written in English.

### **Section 38 Admissions Committee**

(1) <sup>1</sup>An Admissions Committee shall be established to admit qualified students. <sup>2</sup>It shall consist of the speaker of the degree programme, the degree programme co-ordinator and two other university lecturers chosen by the Degree Programme Committee. <sup>3</sup>The Admissions Committee shall appoint a Selection Committee consisting of six university lecturers and three full-time research associates. <sup>4</sup>The members of the Selection Committee shall conduct the selection interviews with applicants and report back to the Admissions Committee. <sup>5</sup>The Admissions Committee shall make the final decision on which applicants are to be granted admission.

(2) The Admissions Committee shall be responsible for the review of qualification and admission requirements for the Elite Master's degree programme according to Section 39.

### **Section 39 Qualification for the Elite Master's Degree Programme**

(1) The qualification requirements for the Master's degree programme shall be a degree that meets the requirements specified in Section 29 (1)(1) **ABMPO/TechFak** in electrical engineering, computer science or applied mathematics with an above-average final grade and passing the qualification assessment process according to **Appendix 2**.

(2) <sup>1</sup>Additional proof that must be submitted in the sense of **Appendix 1** Section 2 (2)(4) **ABMPO/TechFak** shall be proof of English language proficiency at level B2 of the Common European Framework of Reference for Languages. <sup>2</sup>The following shall be accepted as proof of English language proficiency: Abitur (university entrance qualification) certificate, subject-specific university entrance qualification for engineering (fachgebundene Hochschulreife in Fachrichtung Technik; FOS-13 or SOS) or comparable certificates at the level of UNiCert II or Common European Framework of Reference for Languages B2; applicants who completed their university entrance qualification or first degree in English shall not be required to provide proof of English language proficiency.

#### **Section 40 Structure of the Elite Master's Degree Programme**

(1)<sup>1</sup>The Elite Master's degree programme shall comprise 14 modules as listed in **Appendix 1**. <sup>2</sup>The structure of the degree programme shall be recorded in an individual study plan for each student according to Section 41 and shall be approved by a mentor who is an ASC professor. <sup>3</sup>The final decision on the study plan is the Admissions Committee's to make.

(2) <sup>1</sup>Due to the specific subject knowledge that must be acquired as part of the qualification goals of the Master's degree programme, as detailed in the module descriptions, modules that have been completed in a previous Bachelor's degree programme may not generally be accredited for the Master's examination. <sup>2</sup>If mandatory modules have already been completed in the Bachelor's degree programme, modules from the catalogue of technical mandatory electives are to be chosen in their place.

#### **Section 41 Study Plan**

<sup>1</sup>Before the start of the lecture period in each of the first three semesters, students shall submit a study plan for the coming semester that has been approved by their mentor to the ASC office. <sup>2</sup>Before the first and second semester the mandatory elective and elective modules must be chosen and included in the study plan. <sup>3</sup>Before the third semester the topics and supervisors of the research projects must be chosen and included in the study plan. <sup>4</sup>Changes to a student's study plan must be recommended by the mentor and subsequently receive final approval from the Admissions Committee.

#### **Section 42 Examination and Coursework Achievements**

<sup>1</sup>The examination and coursework achievements serve to prove that students possess the required expertise to successfully complete a module. <sup>2</sup>The nature and the extent of the examination and coursework achievements are shown in the study plan in **Appendices 1a and 1b**.

#### **Section 43 Research Projects**

(1) <sup>1</sup>The two research projects (M8 and M9) shall be chosen by the student in consultation with the supervisor on the basis of a project plan before they are commenced and approved by the mentor. <sup>2</sup>All full-time university lecturers at the chairs and research units of the ASC professors are eligible to act as supervisors.

(2) <sup>1</sup>The project plan for the research projects 'Major' and 'Minor' must detail which mandatory elective and elective courses are to be included in it and which additional forms of learning and work (directed reading, presentations, software or hardware projects, reports) are also planned as part of the research project. <sup>2</sup>The planned workload must meet the ECTS requirements for 450 and 300 hours, respectively.

(3) <sup>1</sup>The two research projects are to be chosen with the goal of receiving a broad education in two areas with different topics. <sup>2</sup>The Degree Programme Committee shall issue guidelines on what constitutes a significant distinction between topics.

#### **Section 44 Admission to the Master's Thesis**

(1) Students shall successfully complete modules worth a minimum of 75 ECTS credits to gain admission to the Master's thesis.

(2) <sup>1</sup>In justified, exceptional cases, the Examinations Committee shall be entitled to grant admission to the Master's thesis early. <sup>2</sup>Proof of obtaining the missing credits shall be submitted during the period of thesis work.

### **Section 45 Master's Thesis**

(1) <sup>1</sup>The Master's thesis is supposed to demonstrate students' ability to solve problems in a relevant current area of research, independently. <sup>2</sup>Requirements for the thesis shall be such that it can be completed with a workload of approximately 900 hours within six months. <sup>3</sup>The Master's thesis project shall include at least one presentation with discussion on the results of the Master's thesis; the date of the final presentation shall be determined by the thesis supervisor.

### **Section 46 Evaluation of Achievements for the Master's Degree Programme, Resit Examinations**

(1) The Master's degree programme shall have been passed if all modules of the module groups M1–M14 have been passed.

(2) <sup>1</sup>The final grade of the Master's degree shall be calculated from the grades of the modules M1 to M6, M8 to M10, and M12 to M14. <sup>2</sup>The module grades shall be weighted according to the modules' ECTS credits.

(3) The examination achievements in modules M1 to M6 can be repeated twice; the examination achievements in modules M8 to M10 and M12 to M14 can be repeated once.

## **Part 2: Concluding Provisions**

### **Section 47 Legal Validity and Transitory Provisions**

<sup>1</sup>These degree programme and examination regulations come into effect on the day after their publication. <sup>2</sup>They shall apply to all students who start the Elite Master's degree programme in Advanced Signal Processing & Communications Engineering in the winter semester 2016/2017 or later.

## Appendix 1a: Study Plan for the Master's Degree Programme ASC

Module group			Module	Distribution of ECTS credits				Type and scope of coursework and examination achievements
No.	Name	ECTS credits	Name	1	2	3	4	
	<b>Compulsory modules</b>	<b>60</b>		<b>22.5</b>	<b>12.5</b>	<b>25</b>		
1		5	Mathematical Optimization in Communications and Signal Processing	5				EA: W90 min
2		5	Information Theory and Coding	5				EA: W90 min
3		5	Statistical Signal Processing	5				EA: W90 min
4		5	Game Theory with Applications to Information Engineering	5				EA: W90 min
5		5	Machine Learning in Signal Processing		5			EA: W90 min
6		5	Selected Topics in ASC		5			EA: W90 min
7		5	Kick-off Seminar, Winter & Summer School	2.5	2.5			SA: seminar achievement
8		15	Research Project (Major)			15		Portfolio examination: EA(O30 min) + EA(seminar achievement)
9		10	Research Project (Minor)			10		Portfolio examination: EA(O30 min) + EA(seminar achievement)
	<b>Elective compulsory modules</b>	<b>20</b>		<b>7.5</b>	<b>12.5</b>			
10		15	Technical Mandatory Electives	5	10			EA: see Appendix 1b
11		5	Technical Lab Courses	2.5	2.5			CA: see module handbook
	<b>Elective modules</b>	<b>10</b>			<b>5</b>	<b>5</b>		
12		5	Non-technical Electives from FAU's catalogue of electives		5			EA: according to module specifications
13		5	Technical Electives			5		EA: see module handbook
	<b>Master's thesis</b>	<b>30</b>					<b>30</b>	
14		30	Master's Thesis				30	EA: thesis, presentations (total 50 min)
	<b>Total</b>	<b>120</b>		<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	
Semester hours per week: 80–100				<b>Total ECTS credits</b>				<b>120</b>

<sup>1</sup>An examination achievement generally consists of a 90-minute written examination; see the module handbook for more information.

Abbreviations: EA = examination achievement (Prüfungsleistung), CA = coursework achievement (Studienleistung), W90 min = 90-minute written examination, O30 min = 30-minute oral examination

## Appendix 1b: Catalogue of Technical Mandatory Electives for the Master's Degree Programme ASC<sup>1</sup>

Module name	Semester plan		Type and scope of coursework and examination achievements
	WS	SS	
Convex Optimization	5		EA: W90 min <sup>2</sup>
Image and Video Compression		5	EA: W90 min <sup>2</sup>
MIMO Communications		5	EA: W90 min <sup>2</sup>
Speech and Audio Signal Processing		5	EA: W90 min <sup>2</sup>

<sup>1</sup>The catalogue may be expanded; see the module handbook for more information.

<sup>2</sup>An examination achievement generally consists of a 90-minute written examination; see the module handbook for more information.

Abbreviations: EA = examination achievement (Prüfungsleistung), W90 min = 90-minute written examination

## Appendix 2: Qualification Assessment Process

(1) <sup>1</sup>The following must be included in applications for admission to the Master's degree programme:

1. A certificate according to Section 29 (1)(1) **ABMPO/TechFak** in conjunction with Section 39 (1) with a final grade of 2.0 or better.
2. An English CV with a recent photograph, including information on previous school and university education and, if applicable, professional experience, as well as proof of any relevant work experience or internships that are clearly related to topics in the Master's degree programme.
3. An application form completed in English.
4. If university entrance qualification or first degree were not completed in English: proof of English language proficiency at at least level B2 of the Common European Framework of Reference for Languages.

<sup>2</sup>If 1. applies, the Admissions Committee can set a deadline for the subsequent submission of the documents.

(2) <sup>1</sup>Applications shall be submitted so as to arrive at the office by 15 April for foreign applicants and by 15 July for German applicants. <sup>2</sup>The Admissions Committee may grant an extension of this deadline upon request.

(3) <sup>1</sup>Applicants with a degree within the meaning of Section 29 (1)(1) **ABMPO/TechFak** in conjunction with Section 39 (1) or in the case of Section 29 (3) **ABMPO/TechFak** with an average grade of 2.0 (=gut, good) or better in their achievements to date shall be invited to an interview lasting at least 20 minutes, which may also be conducted via video phone. <sup>2</sup>The interview shall be conducted by at least one member of the Selection Committee. <sup>3</sup>In the interview, the applicant shall outline and defend their qualifications and previous work on subjects relevant to the degree programme and answer technical questions regarding topics relevant to the Elite degree programme at an appropriate level. <sup>4</sup>The applicant's qualification for the Elite degree programme will be assessed based on:

1. Quality of basic knowledge in the areas of signals and systems, digital signal processing, and digital communications (weighting: 40%).
2. Quality of basic knowledge acquired during the Bachelor's degree programme that forms the basis for specialisation in the topics of an eligible study plan (weighting: 45%).
3. A positive prognosis based on improving performance over the course of the studies for the degree that makes the applicant eligible for the Master's degree programme (weighting: 15%).

(4) <sup>1</sup>The Admissions Committee shall notify applicants of the result of the qualification assessment process. <sup>2</sup>A rejection notification shall include reasons and information on the legal remedies available. <sup>3</sup>A repetition of the qualification assessment process on the basis of the documents submitted for the first application shall not be permitted.

(5) <sup>1</sup>The qualification assessment process shall be adjusted to take into account the nature and extent of a student's disability. <sup>2</sup>Students with a doctor's certificate showing credibly that they are either in part or fully incapable of sitting the examination in the intended manner due to long-term or permanent physical disabilities shall be entitled to have the permission of the chairperson of the Admissions Committee to offset this disadvantage by a corresponding extension of their working time or by the examination process being structured differently.

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Erlangen, 29 February 2016

Prof. Dr.-Ing. Joachim Hornegger  
President

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