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.

Note: Students who started their studies before the latest amendment came into effect are requested to also comply with previous amendments and the respective transitory provisions.

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

amended by statutes of
22 February 2019
28 August 2020

Based on Section 13 (1)(2), Section 43 (5)(2), Section 58 (1) and Section 61 (2)(1) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz, BayHSchG), FAU enacts the following degree program and examination regulations:

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Part 1: General Provisions

Preamble

FAU offers an Elite Master’s degree program in Advanced Signal Processing & Communications Engineering (ASC) as part of the Elite Network of Bavaria.

Section 34 Scope

The degree program and examination regulations for the Elite Master’s degree program in Advanced Signal Processing & Communications Engineering (ASC) complement the current version of the General Examination Regulations for the Bachelor’s and Master’s degree programs at the Faculty of Engineering of FAU (ABMPO/TechFak) from 18 September 2007.

Section 35 Standard Duration of Studies, ECTS Credits, Program Start

1 120 ECTS credits shall be required in order to pass the Elite Master’s degree program in Advanced Signal Processing & Communications Engineering. 2 The standard duration of study shall be four semesters. 3 The Master’s degree program may only be started in the winter semester.

(2) The provisions in Section 30 (3)(2) ABMPO/TechFak do not apply to related degree programs.

Section 36 Degree

1 The student is conferred the degree Master of Science (abbreviated MSc) after passing the Master’s examination. 2 The degree may also be used with the addition ‘(FAU Erlangen-Nürnberg)’.

Section 37 Teaching and Examination Language

1 Notwithstanding Section 4 (5)(1) ABMPO/TechFak, the teaching and examination language in the Elite Master’s degree program in Advanced Signal Processing and Communications Engineering (ASC) is English. 2 Individual courses and examinations may be conducted in German. 3 The Master’s thesis shall be written in English; the Examinations Committee shall decide on any exceptions at the student’s request. 4 The degree certificate and final academic record shall be issued in German and English.

Section 38 Admissions Committee

1 An Admissions Committee shall be established pursuant to Section 11 (2) ABMPO/TechFak for the purpose of admitting qualified students. 2 The Admissions Committee shall appoint a Selection Committee consisting of at least six university lecturers and three full-time research associates. 3 The members of the Selection Committee shall conduct the selection interviews with applicants and report back to the Admissions Committee. 4 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 program according to Section 39.

Section 39 Qualification for the Elite Master’s Degree Program

1 The qualification requirements for the Master’s degree program 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) Additional proof that must be submitted as stipulated in Section 2 (4)(3) of the Appendix to ABMPO/TechFak shall be proof of English language proficiency at level B2 of the Common European Framework of Reference for Languages. 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 BOS) 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 Program

(1) The Elite Master’s degree program shall comprise 13 modules as listed in Appendix 1a. The structure of the degree program 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. The final decision on the study plan is made by the Admissions Committee.

(2) Due to the specific subject knowledge that must be acquired as part of the qualification goals of the Master’s degree program, as detailed in the module descriptions, modules that have been completed in a previous Bachelor’s degree program may not generally be accredited for the Master’s examination. If compulsory modules have already been completed during the Bachelor’s degree program, modules from the catalog of technical mandatory elective modules shall be chosen in their place.

Section 41 Study Plan

Before the start of the lecture period in each of the first three semesters, students shall submit a study plan for the coming semester approved by their mentor to the ASC office. Before the first and second semester the compulsory elective and elective modules must be chosen and included in the study plan. Before the third semester the topic and supervisors of the (major) research project must be chosen and included in the study plan. 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 Course Achievements

The examination and course achievements serve to prove that students possess the required expertise to successfully complete a module. The nature and the extent of the examination and course achievements are shown in the study plan in Appendices 1a and 1b.

Section 43 Research Projects

(1) The (major) research project (M8) and (minor) research project pursuant to Appendix 1b, if chosen, shall be determined by the student in consultation with their supervisors on the basis of a project plan and approved by the mentor before they are commenced. All full-time university lecturers at the chairs and research units run by ASC professors are eligible to act as supervisors.
The project plan for the research projects must detail which compulsory elective and elective courses are to be included 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, stating the number of hours allocated to each. The planned workload must meet the ECTS requirements for 450 (major) and 300 hours (minor).

The two research projects shall be chosen with the goal of receiving a broad education in two areas with different topics. The Degree Program 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. In justified, exceptional cases, the Examinations Committee shall be entitled to grant admission to the Master’s thesis early. Any missing documents shall be submitted during the period for thesis work.

**Section 45 Master’s Thesis**

1. The Master’s thesis is intended to demonstrate students’ ability to solve problems independently in a relevant current area of research. The thesis shall have a workload of approximately 900 hours to be completed within six months. The Master’s thesis project shall include at least one presentation followed by a 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 Program, Resit Examinations**

1. The Master’s degree program shall be passed once all modules of the module groups M1 - M13 have been passed.

2. The overall grade for the Master’s degree program is calculated from the grades for modules M1 to M6, M8, M9 and M11 to M13. The module grades shall be weighted according to the modules’ ECTS credits.

3. Notwithstanding Section 33 in conjunction with Section 28 ABMPO/TechFak, the examination achievements in modules M1 to M6 can be repeated twice; the examination achievements in modules M8, M9 and M11 to M13 can be repeated once.

**Part 2: Final Provisions**

**Section 47 Legal Validity and Transitory Provisions**

1. These degree program and examination regulations shall come into effect on the day after their publication. They shall apply to all students who start the Elite Master’s degree program in Advanced Signal Processing & Communications Engineering (ASC) in winter semester 2016/2017 or later.
(2) The first amendment statute shall come into effect on the day after its publication. It shall apply to all students starting a degree program from winter semester 2019/2020 onwards.

(3) The second amendment statute shall come into effect on the day after its publication. It shall apply to all students starting a degree program from winter semester 2020/2021 onwards. Examinations according to the previously valid degree program and examination regulations shall be offered for the last time in summer semester 2023. From the date stated in sentence 3, those students who are affected by the examination regulations becoming invalid shall take their examinations in accordance with the currently valid version of the degree program and examination regulations.
Appendix 1a: Study Plan for the Master's Degree Program ASC

<table>
<thead>
<tr>
<th>Module group</th>
<th>Modules</th>
<th>Distribution of ECTS credits</th>
<th>Type and scope of the course and examination achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name, ECTS Credits</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Compulsory modules</td>
<td></td>
<td>27.5</td>
<td>7.5</td>
</tr>
<tr>
<td>1</td>
<td>Mathematical optimization in communications and signal processing, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Information theory and coding, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Statistical signal processing, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Game theory with applications to information engineering, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Machine learning in signal processing, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Selected topics in ASC, 5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Kick-off seminar, winter &amp; summer school, 2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>Research project (major), 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compulsory elective modules</td>
<td></td>
<td>2.5</td>
<td>17.5</td>
</tr>
<tr>
<td>9</td>
<td>Technical mandatory electives, 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Technical lab courses, 2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Elective modules</td>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Non-technical electives from the entire range of modules offered at FAU, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Technical electives, 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master's thesis</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Master's thesis, 30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Semester hours per week: 80-100

¹ The type and scope of the examination achievement depend on the specific manner in which the teaching unit chosen by the student in the respective seminar is taught, see module handbook for details. An examination achievement generally consists of a 90-minute written examination or an oral examination lasting 30 minutes.

² The type and scope of the examination achievement depend on the specific manner in which the teaching unit chosen by the student in the respective seminar is taught, see module handbook for details.
Abbreviations used:
EA = examination achievement,
CA = course achievement,
W90 min = 90-minute written examination or an oral examination lasting 30 minutes,
O30 min = 30-minute oral examination.

### Appendix 1b: Catalogue of Technical Mandatory Electives for Master’s Degree Programme ASC

<table>
<thead>
<tr>
<th>Module name</th>
<th>Semester plan</th>
<th>Type and scope of the course and examination achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convex optimization</td>
<td>5</td>
<td>EA: W90 min²</td>
</tr>
<tr>
<td>Image and video compression</td>
<td>5</td>
<td>EA: (see FPO CME)</td>
</tr>
<tr>
<td>MIMO communications</td>
<td>5</td>
<td>EA: W90 min²</td>
</tr>
<tr>
<td>Speech and audio signal processing</td>
<td>5</td>
<td>EA: (see FPO CME)</td>
</tr>
<tr>
<td>Research project (minor)</td>
<td>10</td>
<td>EA: (O30 min) + EA (seminar achievement pursuant to Section 6 (3) ABMPO/TechnFak)</td>
</tr>
</tbody>
</table>

1 The catalog may be expanded; see the module handbook for more information.
2 The type and scope of the examination depend on the specific manner in which the chosen module is taught in the respective semester and are stipulated in the module handbook. Possible examination achievements per module are: written examination (60 min, 90 min or 120 min), oral examination (30 min) or EA (O30 min) + EA (seminar achievement pursuant to Section 6 (3) ABMPO/TechnFak).

Abbreviations used:
EA = examination achievement,
W90 min = 90-minute written examination.
Appendix 2: Qualification Assessment Process

(1) The following must be included in applications for admission to the Master's degree program and submitted to the Admissions Committee:

1. A certificate according to Section 29 (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 program.
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 equivalent at least to level B2 of the Common European Framework of Reference for Languages.

2 If 1. applies, the Admissions Committee can set a deadline for documents to be submitted at a later date.

(2) Applications shall be submitted so as to arrive at the office responsible for the degree program by 15 March (for foreign applicants) and by 15 July (for German applicants). The Admissions Committee may grant an extension of this deadline upon request.

(3) Applicants with a degree as defined in Section 29 (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 as a video conference. The interview shall be conducted by at least one member of the Selection Committee. In the interview, the applicant shall outline their qualifications and previous papers on subjects relevant to the degree program and answer questions regarding their papers and topics relevant to the Elite degree program at an appropriate level. The applicant's qualification for the Elite degree program 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 program that forms the basis for specialization in the topics of an eligible study plan (weighting: 45 %).
3. A positive prognosis demonstrated by the applicant’s academic progress in the modules qualifying them for entry to the Master's degree program; discussion of results from the applicant's previous degree (in particular from the transcript of records) (weighting: 15 %).

(4) The Admissions Committee shall notify applicants of the result of the qualification assessment process. A rejection notification shall include reasons and information on the legal remedies available. It will not be possible to repeat the qualification assessment process on the basis of the documentation submitted with the first application.

(5) The qualification assessment process shall be adjusted to take into account the nature and extent of a student’s disability. Students with a doctor’s certificate showing credibly that they are either partially or fully incapable of sitting the examination in the intended manner due to long-term or permanent disabilities which do not affect the
performance which is being tested shall be entitled to be granted permission by the chairperson of the Admissions Committee to have this disadvantage offset by working time being extended accordingly or the examination process being structured differently. However, care must be taken to ensure that the examination is still suitable to provide evidence of skills which are being assessed by the examination.