



Faculty of Computer Science and Mathematics

**Subject-specific study and examination  
regulations for the M.Sc. Mobile and  
Embedded Systems degree programme**

of 20 September 2016

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**Subject-specific study and examination regulations  
for the degree programme  
Mobile and Embedded Systems  
culminating in the degree Master of Science  
at the University of Passau**

**of 20 September 2016**

On the basis of art. 13 sec. 1 clause 2 in conjunction with art. 43 sec. 5 clause 2, art. 58 sec. 1 clause 1 and art. 61 sec. 2 clause 1 of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz; BayHSchG), the University of Passau lays down the following by-laws:

**Table of contents**

§ 1	Scope
§ 2	Aim of the qualification and examination objectives
§ 3	Entry qualifications (subject components)
§ 4	Contents of the degree programme and module groups
§ 5	Types of examination
§ 6	Master's examination (compulsory modules and compulsory elective modules)
§ 7	Effective date

**§ 1 Scope**

<sup>1</sup>The present subject-specific study and examination regulations (FStuPO) supplement the general study and examination regulations (AStuPO) for degree programmes culminating in the qualification Master of Science from the Faculty of Computer Science and Mathematics at the University of Passau, as amended. <sup>2</sup>In the event that a provision contained herein is incompatible with a provision in the general study and examination regulations (AStuPO), the provision of the general study and examination regulations (AStuPO) shall prevail.

**§ 2 Aim of the qualification and examination objectives**

(1) The degree programme in Mobile and Embedded Systems, which culminates in the degree Master of Science is offered by the Faculty of Computer Science and Mathematics at the University of Passau.

(2) <sup>1</sup>Mobile and embedded systems have become omnipresent in all areas of business and private life. <sup>2</sup>The demand for computer scientists with extensive expertise spanning sensor and actuator technology, data and signal processing and hardware-dependent system design is increasing continuously against a backdrop of constant advances in both information and communication technology and the associated integration of embedded systems. <sup>3</sup>Furthermore, human-computer interaction with technical systems, specifically with a view to mobile information processing, is increasingly gaining in significance. <sup>4</sup>The M.Sc. Mobile and Embedded Systems consequently aims to train experts in the interfaces between distributed, networked embedded systems and human-computer interaction. <sup>5</sup>Computer scientists can enjoy the prospect of a versatile, attractive career covering a range of sophisticated disciplines including industry, commerce, insurance, services, management consulting, public administration and, last but not least, scientific research.

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<sup>6</sup>The bachelor's programme in Mobile and Embedded Systems and the consecutive master's programme in Mobile and Embedded Systems offered by the University of Passau are tailored to meet these requirements and provide training within the central subject areas of Mobile and Embedded Systems on the basis of scientific methods. <sup>7</sup>As part of the master's programme in Mobile and Embedded Systems, students acquire a range of specialist knowledge, skills and methods enabling them to undertake independent scientific work, while facilitating their involvement in the latest research topics concerning mobile and embedded systems as well as other related technical disciplines. <sup>8</sup>Those graduating from this degree programme are able to assess theories and methods, established procedures, tools and computer science models according to scientific criteria, by utilising a particularly thorough knowledge and understanding of algorithms, signal processing, sensor technology and human-computer interaction, which they are, furthermore, able to apply when solving real-world challenges. <sup>9</sup>Graduates possess qualified expertise in the specification, implementation, evaluation, design, optimisation and application of complex Computer Science systems. <sup>10</sup>They are able to communicate competently with users and professionals regarding problems and approaches, and present the results of their work. <sup>11</sup>Graduates are capable of taking responsibility for independent activities and sophisticated tasks in industry, public administration and academia, where they may take up executive posts or make a contribution to research and development in the field of Computer Science. <sup>12</sup>Graduates will also have acquired in-depth knowledge in one of the offered specialisations.

(3) The language of instruction is English.

### § 3 Entry qualifications (subject components)

<sup>1</sup>In accordance with § 4 sec. 1 clause 1 no. 1 of the general study and examination regulations (AStuPO) applicants must have a university degree in either Computer Science, Information and Communication Technology, Electronic Engineering, Communications Engineering, Embedded Systems Engineering, Biomedical Engineering or in a related subject, or an equivalent qualification with a corresponding subject component comprising a minimum of 110 ECTS credits. <sup>2</sup>In particular, 50 ECTS credits are required in Computer Science and 15 ECTS credits in the disciplines of Electrical and Electronic Engineering or Information Technology.

### § 4 Contents of the degree programme and module groups

(1) <sup>1</sup>The degree programme is broken down into compulsory core modules and compulsory elective module groups. <sup>2</sup>The compulsory elective modules consist of three specialisations and the general modules area. <sup>3</sup>Students should choose a specialisation from one of the three module groups listed in clause 3 nos. 1 to 3, which they must state when requesting their final transcript pursuant to § 24 sec. 1 clause 1 of the general study and examination regulations. <sup>4</sup>Students who have completed more modules than are required to earn a total of 120 ECTS credits at the time of making the request should indicate which of the modules should be counted towards their final grade (overall average mark).

(2) <sup>1</sup>The compulsory core modules are as follows:

Module	ECTS value	Examination
Mobile and Embedded Systems Seminar	5	Written preparation (maximum of 10 pages) and oral presentation (approx. 20 to 60 minutes); the exact examination duration is published on the noticeboards and on the faculty's website before or at the start of the semester.
Presentation of the master's thesis	3	Oral examination (approx. 20 or 45 minutes); the exact type of examination is announced beforehand by the examiner.

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<sup>2</sup>In order to register for the ‘Presentation of the master's thesis’ module, students must have previously submitted their master's thesis pursuant to § 21 sec. 6 of the general study and examination regulations.

(3) The following module groups are available in the compulsory elective module area:

**1. Human-Computer Interaction specialisation area**

**These modules deal with the methods, tools and applications of human-computer interaction with technical systems, aspects of user-centric software and system development, design of user experiences and the evaluation of user interfaces.**

**2. Systems Engineering specialisation area**

The focus of this module group is on teaching modern methods used to create technical systems consisting of software and hardware as well as to develop and utilise tools applied in the generation, analysis and optimisation of technical systems. The specialist requirements placed on Mobile and Embedded Systems take centre-stage and necessitate the use of methods from the disciplines of software engineering and mathematical modelling.

**3. Data Processing, Signals and Systems specialisation area**

This module group focuses on imparting methods and tools used in the analysis, modelling, control, regulation and prediction of signals and data, which are suitable for processing sensory data from Mobile and Embedded Systems as well as controlling and regulating actuators.

**4. General modules**

The general modules area consists of additional modules which are not included in any of the specialisation module groups.

### § 5 Types of examination

<sup>1</sup>As a rule, modules make use of one of the following types of examination:

	Course	ECTS credits	Examination
1.	Lecture with or without accompanying tutorial	5–9	– Written examination (60 to 120 minutes) or – Oral examination (approx. 15–30 minutes) or – Presentation (approx. 20 minutes) and final report (approx. 20 pages) or – Presentation (approx. 30 minutes) followed by an oral examination (approx. 30 minutes) or – Portfolio  <sup>1</sup> Possible portfolio components include: <ul style="list-style-type: none"> <li>• Complete written documentation</li> <li>• Technical report</li> <li>• Documented source code for individual modules</li> <li>• Live system demonstration</li> <li>• Creation of video demonstrations</li> <li>• Partial presentations on individual work</li> <li>• Final presentation</li> </ul>

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			<p><sup>2</sup>Portfolio work is undertaken during the semester in which the module is taught. <sup>3</sup>The time allotted for individual components of the portfolio review may not exceed 4 weeks. <sup>4</sup>The final work should be delivered no later than 4 weeks after the end of lectures. <sup>5</sup>Individual technical reports should not exceed 10 pages in length. <sup>6</sup>If the technical report consists of several sub-reports, each sub-report should not exceed 5 pages in length. <sup>7</sup>Partial presentations should have a duration of approx. 10 minutes and should involve suitable media and presentation formats. <sup>8</sup>The final presentation should be approx. 15 minutes in length and should likewise involve suitable media and presentation formats.</p>
2.	Lecture with accompanying tutorial and laboratory course	5–9	<p>– Portfolio (project work focused on the development, implementation and presentation of the students' own software components and the project report as well as an oral examination of approx. 30 minutes in length) or</p> <p>– Complete written documentation (10–15 pages) and presentation with discussion (approx. 30 minutes) on the chosen assignment.</p>
3.	Lecture with accompanying seminar	5–9	Final report (maximum 20 pages) and presentation (approx. 20 to 60 minutes) on the project.
4.	Tutorial	5–9	<p>– Portfolio (log books, approx. 15-minute presentation, approx. 60-minute final presentation [compulsory attendance for laboratory work and during presentations held by fellow students]) or</p> <p>– Portfolio (project work involving the independent development and demonstration of experiments [comprehensive compulsory attendance applies]) or</p> <p>– Portfolio (source code, project report and presentation).</p>
5.	Laboratory course	5–9	<ul style="list-style-type: none"> <li>• Written examination (180 minutes)</li> <li>or</li> <li>• Oral examination (approx. 60 minutes)</li> <li>or</li> <li>– Portfolio.</li> </ul> <p><sup>1</sup>Possible portfolio components include:</p> <ul style="list-style-type: none"> <li>• Documented and functioning source code for individual modules (both as source code and as a working application)</li> <li>• Live system demonstration</li> <li>• Creation of video demonstrations</li> <li>• Written partial examination</li> <li>• Technical report</li> <li>• Presentation of the materials created using suitable presentation techniques, e.g. PowerPoint</li> <li>• Partial presentations of individual work</li> </ul>

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			<ul style="list-style-type: none"><li>• Ongoing, rolling technical sub-reports to be compiled into a comprehensive document.</li><li>• Final presentation</li></ul> <p><sup>2</sup>Portfolio work is undertaken during the semester in which the module is taught. <sup>3</sup>The time allotted for individual components of the portfolio review may not exceed 4 weeks. <sup>4</sup>The final work is to be delivered no later than 4 weeks after the end of lectures.</p>
6.	Seminar	5	Written preparation (10 pages maximum) and presentation (approx. 20 to 60 minutes). The exact presentation duration is announced on the noticeboards and on the faculty's website before or at the start of the semester.

<sup>2</sup>Where several examination formats are available to choose from for a course type, the exact examination format is specified in the module catalogue. <sup>3</sup>If the module catalogue also lists several alternative examination formats for a module, the exact examination format is announced on the noticeboards and on the faculty's website before or at the start of the semester. <sup>4</sup>The module catalogue may specify additional course types or examination formats for compulsory elective modules.

### **§ 6 Master's examination (required compulsory modules and compulsory elective modules)**

<sup>1</sup>In order to pass the master's examination the following compulsory modules and compulsory elective modules must be completed pursuant to § 9 sec. 2 of the general study and examination regulations and a total of at least 120 ECTS credits must be accrued:

1. the compulsory core modules pursuant to § 4 sec. 2,
2. modules amounting to a combined minimum of 30 ECTS credits from one of the specialisation module groups listed in § 4 sec. 3 nos. 1 to 3,
3. modules amounting to a combined minimum of 15 ECTS credits from the other two specialisation module groups listed in § 4 sec. 3 nos. 1 to 3.

<sup>2</sup>In order to be allowed to commence writing the master's thesis pursuant to § 20 sec. 1 of the general study and examination regulations, students must have completed modules amounting to a minimum of 60 ECTS credits.

### **§ 7 Effective date**

These by-laws come into effect on 1 October 2016.

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Issued as per the resolution of the Senate of the University of Passau of 27 January 2016 and as approved by the President of the University of Passau on 19 September 2016, reference number VII/2.I-10.3950/2016.

Passau, 20 September 2016

UNIVERSITY OF PASSAU  
The President

Professor Carola Jungwirth

These by-laws were issued by the University on 20 September 2016 and announced on 20 September 2016 by posting on the noticeboards of the University.

The date of announcement is 20 September 2016.