Study Regulations
Governing the Master's Degree Programme 'Entrepreneurial Cybersecurity' at Saarland University

26 April 2018

Please note: This translation is provided for information purposes only. In the event of any discrepancies between the translation and the original German version, the latter shall take precedence.

Pursuant to Section 60 of the Saarland Higher Education Institutions Act of 30 November 2016 (Official Gazette of Saarland, p. 1080) and to the Joint Examination Regulations for the Bachelor's and Master's Degree Programmes of Faculty 6 (Natural Science and Technology Faculty I – Mathematics and Computer Science) of 2 July 2015 (Official Bulletin No. 72, p. 616) as most recently amended by the Ordinance to Amend the Joint Examination Regulations for Bachelor's and Master's Degree Programmes of Faculty 6 (Natural Science and Technology Faculty I – Mathematics and Computer Science) of 28 April 2016 (Official Bulletin No. 47, p. 404) and with the consent of the University Senate at Saarland University, Faculty MI (Mathematics and Computer Science) hereby issues the following Study Regulations Governing the Master's Degree Programme 'Entrepreneurial Cybersecurity'.

Section 1
Scope

These study regulations, which govern the content and structure of the Master's degree programme in Entrepreneurial Cybersecurity, are based on the Joint Examination Regulations for the Bachelor's and Master's Degree Programmes of the Faculty of Mathematics and Computer Science (Official Bulletin No. 72, p. 616) as most recently amended by the Ordinance to Amend the Joint Examination Regulations for Bachelor's and Master's Degree Programmes of Faculty 6 (Natural Science and Technology Faculty I – Mathematics and Computer Science) of 28 April 2016 (Official Bulletin No. 47, p. 404) and the Subject-Specific Regulations Governing the Master's Degree Programme in Entrepreneurial Cybersecurity of xx Month 2018 (Official Bulletin No. xx, p. xx). … The Faculty of Mathematics and Computer Science is responsible for organizing the teaching, study and examinations relating to this programme.

Section 2
Objectives of the degree programme and career relevance

The Master's degree programme Entrepreneurial Cybersecurity aims to build on the knowledge acquired in a Bachelor's degree in computer science or cybersecurity so that graduates from the programme are able to apply relevant methodologies to develop innovative, practically relevant solutions to technical problems in business and commercial environments. Graduates will be equipped with the advanced skills and practical expertise needed to work in industry, commerce and research and will be capable of creating marketable solutions based on areas of current research interest. The programme also aims to strengthen key career skills, such effective communication, teamwork and the ability to independently acquire an understanding of new topics.

Section 3
Start and duration of programme

(1) Students can begin the programme at the beginning of the winter semester of each year.

(2) The curriculum is organized such that the programme can be completed in four semesters (standard period of study).

Section 4
Teaching and learning formats

The curriculum content is taught using the following types of academic instruction:

1. Lectures ('L', standard class size = 100): Lectures serve to introduce a particular subject area and also provide an overview of the relevant theoretical concepts and principles, methodologies and skills, technologies and practical implementations that are common to the subject. Lecture courses provide suggestions for further reading on a topic and open the way to acquiring a deeper understanding of an area through subsequent exercise classes, practical assignments and self-directed study.

2. Exercise or problem-solving classes ('E', standard class size = 20): Exercise or problem-solving classes are small-group sessions used primarily to supplement and reinforce what was learned in the lectures. Students work on representative problems as this provides an opportunity for them to apply and deepen the knowledge they acquired in lectures, to assess their personal understanding of a specific area and to clarify any questions that they may have.

3. Seminars ('S', standard class size = 15):Seminars provide an opportunity for students to broaden the knowledge and skills that they have already acquired and to gain a deeper understanding of a particular field of research by participating in discussions, giving presentations or completing seminar assignments based on their study of the specialist literature and relevant academic sources. They also help students acquire the skills necessary for the effective oral and visual presentation of scientific and academic content and encourage students to engage in critical analysis and discussion of research results. A seminar may also include project-related work in areas of current scientific interest or debate.

4. Practical skills classes and project work ('P', standard class size = 15): Practical skills classes or projects offer a number of practical subject-related topics that introduce students to the specific approaches and methods used in a particular discipline or field of study. The relevant theoretical knowledge underlying a specific topic is acquired by attending lectures and studying the relevant scientific literature. An additional goal of the practical assignments is to provide students with the opportunity to gain practical experience with computer-aided methods. Projects tend to address interdisciplinary topics. Working on a topic offers students the opportunity to work in supervised groups to tackle specific assignments from the initial solution design concept through to its final practical implementation. Students learn about the relationships between theory and practice not only through their own independent study and research, but also through project-based teamwork. Participation in a particular practical skills class or project may be dependent on a student having first successfully completed a required course of lectures and exercise classes.

Section 5
Structure and content of the programme

(1) To graduate from the Master's programme in Entrepreneurial Cybersecurity students shall earn a total of 120 credits as defined by the European Credit Transfer System (ECTS). Of these, at least 60 credits shall be from graded assignments. As a rule, students are required to earn 30 credits per semester.

(2) The degree programme covers modules associated with the sections listed below. Appendix A provides details of the modules and module elements offered in the different sections of the programme, the type of academic instruction used, the number of credit hours per week and the ECTS credits earned, the module frequency, the type of academic assessment and whether the module is graded.

1.   45 ungraded credits from the 'Start-up Projects' section of the programme (3x15 credits; mandatory)

2.   At least 45 graded credits from the 'Cybersecurity and Computer Science' section. The following restrictions apply:

   a. At least 30 of the 45 graded credits shall be acquired in the area of cybersecurity.
   b. At least 18 of the 45 graded credits shall be acquired from the core lecture courses (each worth 9 credits) in the areas of computer science or cybersecurity. The recommended modules are the 'Core Lecture Course on Security' and the 'Core Lecture Course on Cryptography'.
   c. At least 27 of the 45 graded credits shall be acquired from the core lecture courses (each worth 9 credits) and the advanced lecture courses (variable number of credits; mandatory elective) in the areas of computer science or cybersecurity.
   d. 7 graded credits shall be earned from the seminars offered (each worth 7 credits; mandatory elective).
   e. 5 graded credits shall be earned from the module 'Lecture Series on Cybersecurity' (5 credits; compulsory).

5.   At least 15 ungraded credits from elective modules in the areas (mandatory elective):

   a. Seminars and courses concerned with supporting business start-ups (establishing a company, business economics, law, soft skills)
   b. Elective modules from the core lecture courses, advanced lecture courses or seminars in cybersecurity or computer science
   c. Tutoring and supervising undergraduate students in problem-solving classes (usually 4 credits). Tutoring several groups of students is permitted, provided that the exercise or problem-solving classes are from different modules.
   d. Language courses (maximum of 6 credits; modern languages only and not the student's native language)
   e. Modules for which an application has been submitted to and approved by the Examination Board. Activities that students may seek approval for include:
        i. Courses of relevance to the start-up project
       ii. Student activities (particularly assistance with university-related administrative services)
      iii. Courses covering key career skills (maximum of 3 credits per course).

(3) Students may select either entire modules or individual module elements from the mandatory electives offered. Academic credits that were used to obtain the preceding Bachelor's degree cannot also be used to meet the degree requirements in the Master's programme. However, any academic credits that were earned during the Bachelor's degree period but that were not used to meet the total credit requirements of the Bachelor's programme can be transferred to the Master's programme provided that they do not exceed a total of 30 ECTS credits.

(4) Students shall accumulate a total of 65 credits in the compulsory part of the curriculum (of which 15 credits are from the 'Master's thesis' module) and at least 55 credits from the mandatory electives offered.

(5) The number of places available in practical skills classes and seminars and in the mandatory elective modules 'Tutoring', 'Soft-Skills Seminar', 'Business Start-Up Support' and 'Language Courses' are limited. Admission to these modules will be managed by the module coordinator.

(6) Academic credits are either graded or ungraded. A graded academic assessment or examination cannot be split into ungraded and graded credits.

(7) A student who received academic credits for successfully completing a core lecture course is permitted to retake the assessment or examination on one further occasion within the same examination period and during the standard period of study in order to improve the mark awarded (cf. Sec. 13(4) of the Examination Regulations). A student who has received academic credits for successfully completing an advanced lecture course is permitted to retake the assessment or examination on one further occasion within the same examination period in order to improve the mark awarded, provided that the lecturer gave notice at the beginning of the course that the final examination or assessment may be repeated for this purpose. The student shall be awarded the better of the two grades. In all other cases, students will not be permitted to repeat an assessment or examination for which they have already achieved at least the minimum pass mark.

(8) The core lecture courses taken within the mandatory electives block are offered at least once every two years. Seminars and advanced lecture courses will not necessarily be repeated. The Dean of Studies will ensure that a sufficient number of courses and modules are offered each year.

(9) The language of instruction is usually English and will be announced at the beginning of each course or module.

(10) The range of modules offered as mandatory electives may be broadened for one or more semesters by adding other modules or module elements that have been previously approved by the Examination Board. These additional modules or module elements, their weighting in ECTS credits and their classification within the curriculum will be announced before the semester begins.

(11) Detailed information regarding the content of modules and module elements are described in the module catalogue that will be made available in suitable form. Any changes or amendments to the information in the module catalogue not covered in these regulations shall be reported to the Dean of Studies and documented in the appropriate form.

(12) Course attendance may be compulsory for seminars, projects and practical skills classes. Students will be notified of this by the course coordinator at the beginning of the course.

Section 6
Study plan

The Dean of Studies will compile a study plan based on these study regulations that includes details of the types and scope of the module elements offered (Appendix A) with recommendations on how students can organize and structure their studies efficiently (Appendix B). The study plan will be made available in suitable form. The range of modules offered in a particular semester will be published in the Saarland University course catalogue for that semester.

Section 7
Student advisory services

(1) The Central Student Advisory Service (*Zentrale Studienberatung*) at Saarland University provides counselling and guidance to prospective students and enrolled students concerning the content, structure and requirements of academic study at Saarland University. It can also assist students when deciding between various study options and can provide advice on general questions regarding study planning and organization.

(2) Questions concerning curricular demands, learning objectives, admission requirements and programme-specific study planning and organization can be addressed to the departmental academic adviser for 'Entrepreneurial Cybersecurity'.

(3) Questions specific to individual modules should be addressed to the respective module coordinators.

Section 8
Study abroad period

Students have the opportunity to spend part of the programme studying abroad. Students interested in studying abroad should obtain information and advice from a relevant source, take preparatory language courses as needed and should clarify credit transfer arrangements in accordance with the examination regulations by completing a study abroad learning agreement. Information on study abroad opportunities, exchange programmes, scholarships and administrative formalities is available from Saarland University International Office or from the relevant departmental representative. As foreign host universities and scholarship-awarding bodies often have early application deadlines and long application processing times, study abroad applications should generally be submitted to the Examinations Office one year before the planned start date.

Section 9
Master's thesis

(1) By completing a Master's thesis, students demonstrate that they are able to work independently on tackling problems in cybersecurity, computer science or related fields. The completion period for the thesis is three months. Students are awarded 15 ECTS credits for completing their Master's thesis.

(2) The topic addressed in the Master's thesis should be thematically linked to the business start-up project. Students should register their thesis project no later than one semester after successfully completing the second phase of the business start-up project.

Section 10
Commencement

(1) These regulations shall come into force on the day after they are announced in the Official Bulletin of the Institutions of Higher Education in Saarland (*Dienstblatt der Hochschulen des Saarlandes*).

Saarbrücken, 5 June 2018

President of Saarland University
(Univ.-Prof. Dr. Manfred Schmitt)

Appendix A

Master's degree programme (M.Eng.) 'Entrepreneurial Cybersecurity'

Module description	Type of assessment	Grading	ECTS credits ungraded	ECTS credits graded	Winter semester 1 L/E/P credit hrs/wk	Winter semester 1 Credits	Summer semester 2 L/E/P credit hrs/wk	Summer semester 2 Credits	Winter semester 3 L/E/P credit hrs/wk	Winter semester 3 Credits	Summer semester 4 L/E/P credit hrs/wk	Summer semester 4 Credits
Business start-up project (15 credits each)	oral, written	ungraded	45	0	2 / 1 / 0	5	0 / 0 / 10	15	0 / 0 / 10	15	0 / 0 / 10	15
Lecture series on cybersecurity (5 credits)	written	graded	0	5								
Core lectures on cybersecurity (see list below; 9 credits per course)	written exam, preliminary assessment	graded	0	at least 18	4 / 2 / 0 each	18						
Core lectures on computer science (see list below; 9 credits per course) or advanced lectures (variable credits, see below)	written exam, preliminary assessment	graded	0	at least 9			4 / 2 / 0	9	2 / 2 / 0	6	2 / 2 / 0	9
Seminar	oral, written	graded	0	7	0 / 0 / 3	7						
Mandatory electives (see below)		ungraded	at least 15									
Master's thesis	written thesis	graded	0	15								
SUM			60			30		30		30		30

Core lecture courses in cybersecurity

Module description	Type of assessment	Grading	ECTS ungraded	ECTS graded
Cryptography	written exam(s), preliminary assessment	graded	0	9
Data Networks	written exam(s), preliminary assessment	graded	0	9
Embedded Systems	written exam(s), preliminary assessment	graded	0	9
Machine Learning	written exam(s), preliminary assessment	graded	0	9
Operating Systems	written exam(s), preliminary assessment	graded	0	9
Security	written exam(s), preliminary assessment	graded	0	9
Software Engineering	written exam(s), preliminary assessment	graded	0	9
Verification	written exam(s), preliminary assessment	graded	0	9

Core lecture courses in computer science

Module description	Type of assessment	Grading	ECTS ungraded	ECTS graded
Algorithms and Data Structures	written exam(s), preliminary assessment	graded	0	9
Artificial Intelligence	written exam(s), preliminary assessment	graded	0	9
Automated Reasoning	written exam(s), preliminary assessment	graded	0	9
Compiler Construction	written exam(s), preliminary assessment	graded	0	9
Complexity Theory	written exam(s), preliminary assessment	graded	0	9
Computer Algebra	written exam(s), preliminary assessment	graded	0	9
Computer Architecture	written exam(s), preliminary assessment	graded	0	9
Computer Graphics	written exam(s), preliminary assessment	graded	0	9
Database Systems	written exam(s), preliminary assessment	graded	0	9
Distributed Systems	written exam(s), preliminary assessment	graded	0	9
Geometric Modeling	written exam(s), preliminary assessment	graded	0	9
Image Processing and Computer Vision	written exam(s), preliminary assessment	graded	0	9
Information Retrieval and Data Mining	written exam(s), preliminary assessment	graded	0	9
Introduction to Computational Logic	written exam(s), preliminary assessment	graded	0	9
Optimization	written exam(s), preliminary assessment	graded	0	9
Semantics	written exam(s), preliminary assessment	graded	0	9
Telecommunication 1	written exam(s), preliminary assessment	graded	0	9

The Examination Board may add modules to or withdraw modules from this list.

Advanced lecture courses in cybersecurity and computer science

The range of advanced lectures offered changes every semester
The Examination Board may add modules to or withdraw modules from this list.

Module description	Type of assessment	Grading	ECTS ungraded	ECTS graded
	graded	0	variable	variable

Mandatory electives

Module description	Type of assessment	Grading	ECTS ungraded	ECTS graded
Business Start-Up Support	oral, written	ungraded	variable	0
Tutoring (4 credits per module)	tutoring activity	ungraded	4	0
Soft-Skills Seminar	oral, written	ungraded	variable	0
Language Courses (max. 6 credits)	oral, written	ungraded	6	0
Other lecture courses in the areas cybersecurity and computer science				

The Examination Board may add modules to or withdraw modules from this list.

Key: L = Lecture, E = Exercise or problem-solving class, P = Project or practical training, PA = Preliminary assessment, credits = ECTS credits, credit hrs/wk = no. of class or supervised hours per week during the semester

Appendix B

Example study plan – M.Eng. Entrepreneurial Cybersecurity

1	Core lecture course (9 credits)	Core lecture course (9 credits)	Seminar (7 credits)	Lecture series (5 credits)	30
2	Core lecture course (9 credits)	Business start-up support (3 credits)	Soft skills (3 credits)	Start-up project (15 credits)	30
3	Advanced lecture course (6 credits)	Soft skills (6 credits)	Business start-up support (3 credits)	Start-up project (15 credits)	30
4	Master's thesis (15 credits)			Start-up project (15 credits)	30