Study Handbook

Master of Science

Communications and Electronics Engineering

Winter Semester 2024/25

https://www.cit.tum.de/cit/studium/studiengaenge/master-communications-electronics-engineering/

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– Academic and Student Affairs –
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80333 München

Legally valid are only the official published general Academic and Examination Regulations for Bachelor's and Master's Programs (APSO) at the Technical University of Munich and the Academic and Examination Regulations for the master's program in Communications and Electronics Engineering (FPSO).

Contents

Preface

Dear MSCE Students,

The intent of this handbook is to explain the regulations of the MSCE program and to provide you with a “road map” for your studies, beginning with the planning of the first semester and ending with the graduation two years later.

As an introduction, Chapter 1 gives some hints on where to find general information about studying at TUM. Chapter 2 presents the program and its history and explains the study goals. Chapter 3 is the main part of the booklet. It includes guidelines for courses, the internship, and the master’s thesis. The basic structure of the program is shown and the different parts are explained, followed by a list of requirements for graduation.

We hope that this handbook will help to answer most of your questions.

All information can be found on the website:

https://www.cit.tum.de/cit/studium/studiengaenge/master-communications-electronics-engineering/

The primary point of contact for queries related to the MSCE program is the e-mail address: msce.asa@xcit.tum.de

Sincerely,

Prof. Dr.-Ing. Antonia Wachter-Zeh
Program Director

Prof. Dr.-Ing. Ulf Schlichtmann
Program Director

Iris Schachtner
Program Manager
Room: N2147, Tel: 089/289-28465
E-mail: iris.schachtner@tum.de

Kamolrat Ruangkhanap
Program Officer
Room: N2150, Tel: 089/289-28378
E-mail: msce.asa@cxit.tum.de

1 General Information about Studying at TUM

The website http://www.tum.de/en/studies/ offers some interesting facts about TUM and its study programs. You will also find important information concerning formalities, such as enrollment, residence permit, health insurance, student fees etc.

It is very important that you make sure that the program management knows your exact email address. This address should also be correct in your TUMonline account. Failure to do so may result in loss of essential documents for enrollment and studies.

The official university calendar, which includes the semester breaks and holiday, can be found here:

https://www.tum.de/en/studies/application/application-info-portal/dates-periods-and-deadlines

Semester duration and lecture period

Winter Semester 2024/25:

1st October 2024 – 31 March 2025

Lecture period:

14 October 2024 – 7 February 2025

Summer Semester 2025:

1 April 2025 – 30 September 2025

Lecture period:

23 April 2024 – 25 July 2025

Lecture-free Days/Holidays

Dies Academicus 5 December 2024

Christmas Vacation 24 December 2024 – 6 January 2025

And all bank holidays

2 Overview & Study Goals of the MSCE Program

Since 1998, the Department of Electrical and Computer Engineering at TUM has been offering a high-level graduate program leading to the academic degree *Master of Science in Communications and Electronics Engineering*. The so-called MSCE program is especially designed for international students and is taught in English. It is a two-year program, including a 9 week-research internship period in a company or at a chair at the School of Computation, Information and Technology (CIT) and a six-month period for the completion of the master's thesis.

The goal of the program is to attract foreign students mainly from Asia, South and North America, Middle East, Eastern Europe and Africa to our university. Upon successful completion, the students are awarded the academic degree *Master of Science (M.Sc.).*

From the first day on, students are taught the fundamental concepts of communications engineering, such as information theory and coding, as well as communication networks, software engineering, signal processing, IC Design and computer aided circuit design, just to name a few. In addition, advanced courses taught by renowned guest professors are offered. Moreover, there are courses taught by adjunct professors from industry, a management course, a seminar, labs and semester projects.

In 2005, we expanded our MSCE program. Until then, the focus had been exclusively on system aspects of communications engineering, with a few IC implementation related courses being offered as electives. Now, we offer core modules on Communications Systems (CS) and Communication Electronics (CE). The latter emphasizes the implementation of communications systems by means of electronic circuits. The variety of electives allows students to become experts on certain aspects of the topics covered by the chosen specialization.

Since the beginning in 1998, many students from all over the world have joined the program. Some of them had just completed their bachelor's degree while others had one- or two-year work experience. Exceptionally qualified students may receive scholarships covering living expenses from either DAAD, Bayhost, companies, their home university, or another private or governmental institution. Students who receive a scholarship are required to report this fact to the MSCE administration.

We are very proud of our program, and we believe that our forthcoming graduates will be equipped for leading positions in globally operating companies in Germany, their home countries and worldwide.

3 MSCE Study Guidelines

3.1 Structure of the Program

The MSCE program is a two-year program, divided into four semesters. This includes a 9-week period for a research internship and a six-month period for the completion of the master's program. Courses start in October. The following schedule gives an overview:

MSCE Program Schedule

October through Mid-February	Semester 1
End of February	Final Exams for Semester 1
March through Mid-April	Spring Break
Mid-April through July	Semester 2
End of July to August	Final Exams for Semester 2
August through Mid-October	Research Internship (only recommended)
Mid October through Mid-February	Semester 3
End of February	Final Exams for Semester 3
March through September	Semester 4: Master's Thesis
November	Graduation

During the first semester, at least two modules must be selected from each core module field Communications Systems (CS) and Communications Electronics (CE), as listed in the course curriculum. Most courses have a weekly lecture of two hours. In addition, there is a weekly tutorial given by a teaching assistant. During the semester, in some courses students can assess their skills in homework and mid-term exams. At the end of the semester, the final exams for each course take place.

In addition, there are two modules in advanced topics taught by internationally renowned visiting professors in the second semester.

After the second semester students should do a 9-week, full-time research internship (called "Forschungspraxis" in German) at a company or at a chair at TUM. If they conduct their Forschungspraxis in a company, then students obtain valuable practical experiences as well as insight into the daily operations of a company. They learn to relate classroom training to business situations and apply theory to practice. Moreover, they have the opportunity to demonstrate their skills and knowledge to a potential future employer.

Students also participate in a seminar where they prepare a presentation about a particular research topic.

A fundamental part of the program is the master's thesis. It gives students the opportunity to explore a topic of their choice in depth. The thesis enables students to improve research, analytic, and managerial skills. Research and analytic skills include the application methods and knowledge learned in the courses and through literature review. Managerial skills include planning and doing a project in a limited period.

After having successfully completed the program, students are awarded the Master of Science (M.Sc.) in Communications and Electronics Engineering degree. This academic degree entitles students to enter PhD / Dr.-Ing. Programs. If students are interested in pursuing a doctorate (PhD) at TUM we strongly recommend that they acquire a good command of the German language during the two years of the MSCE program, as this will increase their chances of being offered a doctoral research position.

3.2 Modules MSc Communications and Electronics Engineering (MSCE)

Modules MSc Communications and Electronics Engineering (MSCE)
PO2023 (start WS23/24)

Module ID	Module	Lecturer	Semester	ECTS	Focus on
Core Modules Communications Systems (CS): at least 10 Credits					
EI70330	Data Networking	Kellerer	WS	5	
EI70320	Channel Coding	Wachter-Zeh	WS/SS	5	
EI70350	Information Theory	Kramer	WS	5	
EI70240	Statistical Signal Processing	Utschick	SS	5	
EI7432	System Aspects in Communications	Viering	WS	5	
Core Modules Communication Electronics (CE): at least 10 Credits					
CIT4430015	Analog and Mixed-Signal Circuit Design	Brederlow	WS	5	
EI70610	Electronic Design Automation	Schlichtmann	SS	5	
EI70530	Embedded Systems and Security	Sigl	WS/SS (German in SS)	5	
EI7355	Nanosystems	Becherer	WS/SS	5	
EI7384	System-on-Chip Technologies	Herkersdorf	WS	5	
Elective Modules Advanced Topics: at least 5 Credits					
EI79001	Advanced Topics in Communications Systems	Guest Professor	SS	5	CS
EI79002	Advanced Topics in Communications Electronics	Guest Professor	SS	5	CE
Electives: 28 Credits					
Fewer electives, if you have passed more core modules or elective modules advanced topics, in total 53 credits:					
CIT4330008[1]	5G New Radio Communications: Physical Layer Channels and Procedures	Boche	WS/SS	5	CS

[1] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25

Module ID	Module	Lecturer	Semester	ECTS	Focus on
EI7433	Adaptive and Array Signal Processing	Ivrlac	WS	5	CS
IN2097	Advanced Computer Networking	Carle	WS	5	CE
EI71070	Advanced Cryptographic Implementations	De Santis	SS	5	CS
EI71105[2]	Advanced Topics in IoT Security	Steinhorst	SS	5	CE
EI7523	Analog Bipolar Electronics: Devices, Simulation and Circuits	Brederlow	SS	3	CE
EI7450	Analysis, Modelling and Simulation of Communication Networks	Kellerer	SS	6	CS
EI73081	Antennas and Wave Propagation	Eibert	SS	5	CS
CIT4430010	Antennas for Space and Aeronautics Applications	Eibert	WS	5	CS
EI71086	Applied Machine Intelligence	Diepold	SS	9	CS
CIT4330010	Brain, Mind and Cognition	Diepold	WS/SS	6	CS
EI7411	Channel Codes for Iterative Decoding	Liva	SS	5	CS
EI7271	Chip Multicore Processors	Herkersdorf	SS	6	CS/CE
EI70520	Circuit Design for Security	Sigl	SS	5	CE
CIT4330023	Circuit Reliability for AI in Advanced Technologies	Amrouch	SS	6	
EI7440	Circuit Theory and Communications	Ivrlac	WS	5	CS/CE
EI71108	CMOS Analog-to-Digital Converters	Brederlow	SS	5	CE
EI74121	Coded Modulation	Bartz/Matuz	SS	5	CS
CIT4330015	Coding for Private Reliable and Efficient Distributed Learning	Kramer	WS	5	CS
EI71087	Coding Theory for Storage and Networks	Wachter-Zeh	SS	5	CS
EI71004	Communication Acoustics	Seeber	WS	6	CS
EI7644	Communication Network Reliability	Mas Machuca	SS	5	CS
CIT4330006	Communication Networks, Modeling and Optimization	Kellerer	SS	5	CS
EI73181[3]	Computational and Analytical Methods in Electromagnetics	Eibert	WS	6	CS/CE
EI74351	Convex Optimization	Utschick	WS	6	CS
EI71067	Digital Signal Processing for Optical Communication Systems	Fehenberger	SS	5	CS
EI71104	Embedded System Design for Machine Learning	Schlichtmann	WS	6	CE
CIT4330021	Fundamentals of Foundation Models	Heckel	SS	5	CS
EI70410	High-Frequency Amplifiers and Oscillators	Eibert	SS	5	CE
EI70630	HW/SW Codesign	Herkersdorf	WS/SS	5	CE
EI7341	Image and Video Compression	Steinbach	SS	5	CS

[2] wird in WiSe24-25 angeboten/ will be offered in winter semester 2024-25
[3] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25

Module ID	Module	Lecturer	Semester	ECTS	Focus on
CIT433001 6	Innovative Computing for AI	Amrouch	WS	6	
CIT443000 2	Integrated Circuits for Radio Applications	Hagelauer	WS	5	CE
EI71083	Intelligent Machine Design - Mechatronics Fundamentals	Haddadin	SS	6	CE/CS
EI71064	Introduction to Quantum Networks	Nötzel	WS/SS	5	CS
CIT433022	Introduction to Quantum Optics and Applications	Boche	WS/SS	5	CS
CIT443000 9	Inverse Problems in Electromagnetic Imaging	Eibert	SS	5	CS
CIT433000 9[4]	IoT Security	Steinhorst	WS/SS	5	CE
EI70360	Machine Learning and Optimization	Heckel	WS	5	CS
EI71018	Machine Learning for Communications	Kramer	WS	5	CS
CIT433031	Machine Learning for Electronic Design Automation and Manufacturing	Wille	WS/SS	5	CE
EI71059[5]	Mixed Integer Programming and Graph Algorithms for Engineering Problems	Schlichtmann	WS	5	CE
EI7436	MIMO Systems	Joham	WS	6	CS
EI71095	Multi-Criteria Optimization and Decision Analysis for Embedded Systems Design	Herkersdorf	WS	5	CE
EI70220	Digital Signal Processing	Steinbach	WS/SS	5	CS
EI7352	Multimedia Communications	Steinbach	SS	5	CS
EI7353	Multi-User Information Theory	Kramer	SS	5	CS
EI7356	Network Planning	Schupke	WS	5	CS
EI7494	Numerical Linear Algebra for Signal Processing	Utschick	SS	6	CS
EI5075	Optical Communication Systems	Hanik	WS	6	CS
EI7633	Optical Networks	Mas Machuca	WS	5	CS
EI70730	Memory Technology for Data Storage	Kreupl	WS/SS	5	CE
CIT443001 8	Phase Locked Loop / Clocked Circuits	Brederlow	WS	5	CE
EI7485	Physical Principles of Electromagnetic Fields and Antenna Systems	Ivrlac	SS	6	CS
EI71029	Physical Unclonable Functions	Sigl	WS	5	CE
EI71103	Post Shannon Theory	Boche	SS/WS	5	CS
EI71073	Quantum Computers and Quantum Secure Communications	Sepulveda	SS	5	CE
EI76471	Quantum Information Theory	Boche	WS/SS	5	CS
EI71093	Quantum Optomechanics	Weig	SS	5	CE
EI73761	Radar Signals and Systems	Siart	WS	5	CS
EI0432	Satellite Navigation	Günther	WS	6	CS
EI71060	Security in Communications and Storage	Wachter-Zeh	WS	5	CS

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[5] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25

Module ID	Module	Lecturer	Semester	ECTS	Focus on
EI70380	Signal Processing and Machine Learning	Utschick	SS	5	CS
EI71036	Software Architecture for Distributed Embedded Systems	Steinhorst	WS	5	CE/CS
EI71068	Solving Inverse Problems with Deep Learning	Heckel	SS	6	CS
EI70640	Synthesis of Digital Systems	Schlichtmann	WS/SS	5	CE
CIT4430001	System Design for High-Frequency and High-Data Rate Applications	Hagelauer	WS	5	CE
EI71013	System Design for the Internet of Things	Steinhorst	SS	5	CE
EI7624[6]	Techno-Economic Analysis of Telecommunication Networks	Mas Machuca	WS	5	CS
EI50141	Testing Digital Circuits	Otterstedt	WS	5	CE
EI5052	Time-Varying Systems and Computations	Diepold	WS	6	CE
EI70550	Timing of Digital Circuits	Li	WS	5	CE
EI71075	Wireless Communications	Kramer	WS	5	CS

Laboratories: 12 Credits

CIT4310006	6G Business Modeling and Prototyping	Kellerer	WS/SS	9	CE/CS
CIT4310008	Brain-inspired Computing for AI	Amrouch	WS/SS	6	
EI5032	Communications Lab	Kramer	WS	6	CS
EI72071	Computational Haptics Laboratory	Steinbach	SS	6	CS
EI72561	Convex Optimization Laboratory	Utschick	SS	6	CS
EI50881	High-Frequency Circuit Laboratory	Eibert	WS/SS	6	CE
EI50291	Image and Video Compression Lab	Steinbach	WS/SS	6	CS
EI78049	IoT Remote Lab	Steinhorst	WS/SS	6	CE
EI78060	Lab CMOS A/D Converter Design	Brederlow	WS	6	CE
CIT441016	Lab CMOS PLL Circuit and System Design	Brederlow	SS	6	CE
EI78064	Lab CMOS Voltage Regulation Circuit Design	Brederlow	SS	6	CE
CIT4410013	Laboratory Design of Integrated Analog and Mixed-Signal Circuits	Hagelauer	SS	6	CE
CIT4410011	Lab Integrated Circuits for Radio Applications	Hagelauer	SS	6	CE
CIT4410012	Laboratory on System Design for High-frequency and High-datarate Applications	Hagelauer	SS	6	CE
CIT431011	Practical Course Atomistic Simulation of Nanomaterials and Electronic Devices	Vogl	WS/SS	5	CE
CIT4310001	Praktikum ASIC Design von Hardwarebeschleunigern für RISC-V	Sigl	WS/SS	6	CE
CIT4310003	Programmable Communication Networks Lab	Kellerer	WS/SS	6	CS

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Module ID	Module	Lecturer	Semester	ECTS	Focus on
EI5042[7]	Project Lab IC Design	Herkersdorf	WS/SS	6	CE
EI78033[8]	Projektpraktikum Audio-Signalverarbeitung	Seeber	WS/SS	6	CE
EI78075	Projektpraktikum Human Activity Understanding	Steinbach	WS/SS	6	CS
EI78071	Projektpraktikum Nanomagnetische Bauelemente	Becherer	WS/SS	6	CE
EI5028	Satellite Navigation Lab	Günther	SS	6	CS
EI7493	Signal Processing for Audio Technology	Seeber	SS	8	CS
EI5030	Simulation of Optical Communication Systems Lab	Hanik	WS/SS	6	CS
EI5069	Smart Card Lab	Sigl	WS/SS	6	CS/CE
EI78045[9]	Software Defined Radio Laboratory	Boche	WS/SS	6	CS
EI7402	SystemC Lab	Herkersdorf	WS/SS	6	CE
EI7403	VHDL System Design Lab	Schlichtmann	WS/SS	6	CE
CIT431009	Wireless Communications Laboratory	Kramer	SS	6	CS
EI50471	Wireless Sensor Networks Laboratory	Kellerer	WS/SS	6	CS

The labs count towards the final grade point average with their corresponding credit weight. For all labs at the department, there is always a special registration deadline.

Registration information for labs and details about introductory meetings are made available on the websites of the various chairs shortly before the beginning of each semester. So please check these websites.

Seminars: 5 Credits

CIT4320002	Seminar AI für Processor Design	Amrouch	WS/SS	5	
EI77001	Seminar Embedded Systems and Internet of Things	Steinhorst	WS/SS	5	CS
EI77009	Seminar Machine Learning	Heckel	WS/SS	5	CS
EI77692[10]	Seminar Micro- and Nanosystems Technology	Hagelauer	SS	5	CE
CIT442002	Seminar Nanomechanical Sensors and Applications	Weig	WS/SS	5	CE
EI77015	Seminar on Coding and Cryptography	Wachter-Zeh	WS/SS	5	CS

[7] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25
[8] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25
[9] wird im Wintersemester 2024-25 nicht angeboten/ will not be offered in winter semester 2024-25
[10] wird im Wintersemester 2024/25 angeboten/ will be offered in winter semester 2024/25

Module ID	Module	Lecturer	Semester	ECTS	Focus on
EI77013	Seminar on Digital Communications	Kramer	WS/SS	5	CS
EI77014	Seminar on Optical Communications	Hanik	WS/SS	5	CS
CIT4320005	Seminar Quantum Information Processing Devices	Vogl	WS/SS	5	CE/CS
CIT43200003	Seminar Quantum Networks	Vogl	WS/SS	5	CE/CS
EI5092	Seminar on Security in Information Technology	Sigl	WS	5	CS/CE
EI7778	International Seminar Signal Processing	Utschick	SS	5	CS
EI5090[11]	Seminar on Signal Processing in Communications	Utschick	WS	5	CS
EI5091	Seminar on Topics in Antennas and Propagation	Eibert	WS	5	CS/CE
EI5087	Seminar on Topics in Communications Networking	Kellerer	WS	5	CS
EI77502	Seminar on Topics in Electronic Design Automation	Schlichtmann	WS	5	CE
EI77501	Seminar on Topics in Integrated Systems	Herkersdorf	WS	5	CE
EI77503	Scientific seminar on structure, architecture and application of sensor circuits	Brederlow	WS/SS	5	CE
EI5084	Seminar on Topics in Signal Processing	Steinbach	WS	5	CS

Interdisciplinary Courses: 8 Credits

Recommended:

	German Language Course	TUM Language Center	WS/SS	6	
EI04004	Strategic Management for Engineers	Sauerbrey	WS	3	

As interdisciplinary course, any TUM course on a topic different from electrical and computer engineering (no EIxx module number) and other universities can be taken. The courses can only be counted, if there is a confirmation of the course including the number of credits. Any language course (excepting English), offered by e.g. the TUM language center, can be counted as an interdisciplinary course. If you want to be sure, if your course will be counted, please contact the program manager. The grades of the interdisciplinary modules will not count toward your final grade.

Research Internship: 12 Credits

Duration and Timing

The research internship (in German so called Forschungspraxis) is a career-related, full-time (approx. 35-40 hours per week, depending on the company) professional experience at the

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university or in industry with a minimum length of 9 weeks. If required by industry, we can certify that 9 weeks are required as a mandatory research internship for your studies. Usually it is scheduled immediately after the second semester until the beginning of the third semester. Please consider the following suggested timeline:

March	Start looking for research internship placement
End of July	Final Exams for semester 2
August through mid-October	Research Internship
Mid-October	Semester 3 begins
End of October	Hand in the required paperwork

Research Internship Arrangement & Registration

How to get an internship

Students must arrange for an internship themselves. The following guidelines have to be followed:

In case you need a confirmation that a research internship is required by your curriculum, please contact us: msce@ei.tum.de

To find a research internship project, please contact the chairs directly. Some chairs list available projects on their website. If you want to do the research internship in industry, you have to find a professor at TUM who will supervise it. Please find a professor before signing any industry contract to avoid any inconvenience. Once you have found a research internship position, please report it to the program manager. You must write a technical report about your internship (approx. 1-2 pages per week). At the end of the research internship, you will present your results to the professor, followed by a short discussion.

Technical Report

At the end of your research internship, you must write a technical report that documents the work and presents the results. A good structure for an internship report is: cover and title page; abstracts; table of contents; introduction; problem definition; theory; implementation; testing for correctness of results, performance, usability, assessment; conclusions and ideas for future work; and references.

The total length of the report should be at least 1-2 pages per week.

You should also include one page of critical analysis (not simply a description) of the experience in terms of learning objectives and overall experience at the time of completion

You should also include one page of critical analysis (not simply a description) of the experience in terms of learning objectives and overall experience at the time of completion of the internship.

3.3 Graduation Requirements

To complete the MSCE program (i.e., to receive the academic degree Master of Science in Communications and Electronics Engineering), students have to pass:

- 2 Core Modules “Communications Systems”, 10 credits,
- 2 Core Modules “Communications Electronics”, 10 credits,
- Elective Modules Advanced Topics, 5 credits

- Electives, 28 credits (or fewer, if you passed more core modules)
- Labs, 12 credits
- Seminar, 5 credits
- Interdisciplinary modules, 8 credits
- 9 week of research internship, 12 credits
- Master's thesis, 30 credits

➔ 120 Credits

3.4 Course-Work and Lab Requirements

3.4.1 Grading Scale and Grading

The grading scale ranges from 1.0 to 5.0, where 1.0 is the best and 5.0 the worst grade.

The following grades are possible:

1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3	4.7	5.0
very good		good			satisfactory			sufficient		fail		

Students must report a grade of 4.0 to pass the course. Failed courses, labs, seminars can be repeated according to the academic progress check. **It is not possible to repeat passed exams.** Grades from the core modules CS and CE, electives, seminars and labs as well as the master thesis count towards the final grade point average according to their credit weight.

The grades of the interdisciplinary modules and the research internship will not count towards the final grade.

In addition, in some courses there are mid-term exams and/or graded homework, where the professors decide how the grades are credited towards the final exams. More information about the types of exams is given in the module description on the MSCE website or in TUMonline. The final exams are scheduled immediately after the end of the semester in which the course was offered.

3.4.2 Academic Progress Check

Students must receive

➨ **<u>until the end of the second semester</u>**.

- 10 credits from the core modules communications systems
- 10 credits from the core modules communications electronics

Further, students must receive a minimum number of credits per semester:

- at least 30 credits by the end of the third semester
- at least 60 credits by the end of the fourth semester
- at least 90 credits by the end of the fifth semester

➨ Failure to meet these requirements leads to exmatriculation

Failed exams can be repeated up to a certain time limit or alternatively even replaced by other modules.

3.5 Exams

3.5.1 Board of Examiners

The Board of Examiners MSc (in German Master-Prüfungsausschuss) of the Professional Profile Electrical Engineering is responsible for all issues concerning exams and grades in your program:

Board of Examiners MSc Professional Profile of Electrical Engineering

Chair: Prof. Dr. rer. nat. Eva Weig

Registrar: Benita Paraschoudis
Delegate: Iris Schachtner

So please contact Iris Schachtner, iris.schachtner@tum.de

3.5.2 Registration of Courses and Labs for Exams

Each semester you must officially register in TUMonline for the exams for all courses, electives, **labs** and the **seminar** that you are attending during the semester. You will be informed by the MSCE team about the registration period.

Do not forget to register in time.

Apart from the MSCE curriculum, additional courses (also courses in German) may be attended. However, these extra courses do not count toward your MSCE curriculum. However, you also have to register these exams in TUMonline.

3.5.3 Identification during Exams

During an exam all students are requested to present a valid official identification document with picture (i.e. their passport or national identity card), and a proof of enrollment (i.e. student card). Note that the student cards with pictures or public transportation documents with pictures are not valid proofs of identify.

3.5.4 Withdrawal of Registered Exams, Illness

If a student is not able to attend an exam, which he or she is registered for, he or she can formally declare the withdrawal. The reason for the withdrawal must be specified and documented by appropriate certificates. In case of illness, a medical certificate by a physician must be provided. The medical certificate must be issued on the day of the missed exam and has to be immediately submitted to the Board of Examiners office (N2150) or to the program manager.

3.5.5 Transcript of Records

A transcript of records with your grade can be downloaded via your TUMonline account. If you need a signed and stamped transcript, please send us an e-mail: msce.asa@xcit.tum.de

3.6 Research Internship Guidelines

3.6.1 Duration and Timing

The research internship (in German so called Forschungspraxis) is a career-related, full-time (approx. 35-40 hours per week, depending on the company) professional experience at the university or in industry with a minimum length of 9 weeks. If required by industry, we can certify that 9 weeks are required as a mandatory research internship for your studies. Usually it is scheduled immediately after the second semester until the beginning of the third semester. Please consider the following suggested timeline:

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Once you have found a research internship position, the professor will register you. You must write a technical report about your internship (approx. 1-2 pages per week). At the end of the research internship, you will present your results to the professor, followed by a short discussion.

Technical Report

At the end of your research internship, you must write a technical report that documents the work and presents the results. A good structure for an internship report is: cover and title page; abstracts; table of contents; introduction; problem definition; theory; implementation; testing for correctness of results, performance, usability, assessment; conclusions and ideas for future work; and references.

The total length of the report should be at least 1-2 pages per week.

You should also include one page of critical analysis (not simply a description) of the experience in terms of learning objectives and overall experience at the time of completion of the internship.

3.7 Master's Thesis Guidelines

In the fourth semester, students must write a master's thesis under the supervision of a CIT professor. The duration of the master's thesis is 6 months of full-time involvement. The thesis is worth 30 credits.

Students must fulfill the internship (12 credits) and **course work requirements** (63 credits, only course work credits are counting, interdisciplinary subjects are not counting) to be allowed to start the thesis work.

Students are responsible for finding a topic for a master's thesis. To be able to start in the fourth semester and use the full 6 months, topic arrangements must be completed during the lecture period of the 3rd semester. Please consider that the arrangements might take some time.

In order to arrange a master's thesis, you should contact a CIT professor or a research assistant with whom you share an interest. Research areas and open topics are published on the websites.

You can also do to the master's thesis in industry. However, please note that you need also a CIT Professor as your supervisor.

3.8 Final Grade Average

The final grade point average is the weighted average of the individual final grades of the core and elective courses, the seminar, the labs, and the master's thesis according to the credit weight.

3.9 Certificates

For any certificates related to your studies (e.g. transcript, confirmation of your studies, internship requirement confirmation, etc.) please contact us: msce.asa@xcit.tum.de

4 Additional Information

4.1 Computer Access

Computer access is available to all students within the EIKON project.

Detailed information is available:

https://www.ce.cit.tum.de/en/ldv/eikon/

4.2 Room Finder

Orientation around campus is facilitated by the TUM room finder:

https://nav.tum.de/

4.3 Accommodation

The MSCE program does not provide students with accommodation. It is the responsibility of each student to arrange for his/her own accommodation.

4.4 Student Fee/Tuition Fee and Leave of Absence

Semester Fee

All students must re-enroll before the next semester starts if they want to continue their studies.

Currently, the deadline for paying the semester fee is 15 August for winter semester and 15 February for summer semester. If you do not pay in time, your enrollment will be terminated automatically.

All information about the student fee is available on the website:

http://www.tum.de/en/studies/fees-and-financial-aid/payment-of-fees/

Tuition Fee

For international students from third countries, i.e. countries that do not belong to the European Economic Area (EU + Iceland, Liechtenstein and Norway), tuition fees will be charged from the winter semester 2024/25.

https://www.tum.de/en/studies/fees/tuition

Leave of Absence

For important reasons (e.g. illness attested by physician, maternity or paternity leave, time off to care for a close relative), students can take a leave of absence for a whole semester.

On the following website you could find more information:

http://www.tum.de/en/studies/during-your-studies/leave-of-absence/

While taking a leave of absence, you also have to pay the fee. You are not allowed to take part in exams for the first time but you are allowed to take repeated exams.

If you take a leave of absence due to maternity or paternity you are also allowed to write “regular” exams.

5 Contact

Program Manager

Iris Schachtner
Room: N2147, Tel: 089/289-28465
Email: iris.schachtner@tum.de

Program Officer

Kamolrat Ruangkhanap
Room: N2150, Tel: 089/289-28378
Email: msce.asa@xcit.tum.de