

Welcome @ M.Sc. Power Engineering (MSC-PE)

Dr. Markus Eblenkamp

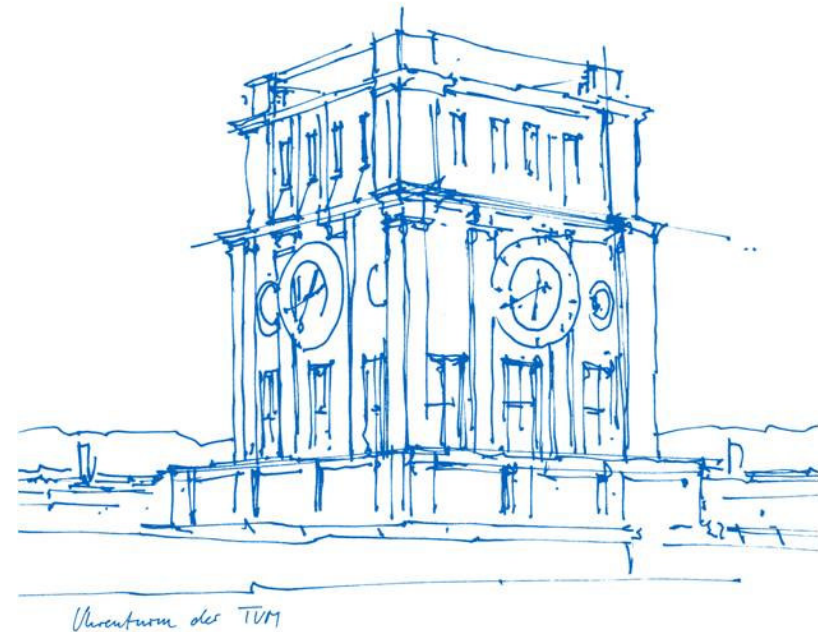
Program Manager MSC-PE

Technische Universität München

School of Engineering and Design

Academic and Student Affairs

Garching (Munich), 25 March 2025



M.Sc. Power Engineering (MSC-PE)

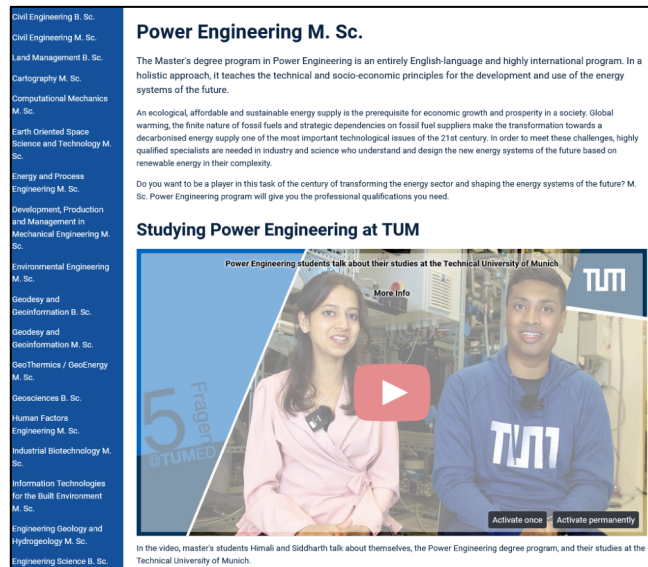


- Entirely taught in English
→ Highly international
- Ecological, affordable and sustainable
energy systems of the future
- USP: Electrical & Mechanical
Engineering

Web Presence

Homepage

<https://www.ed.tum.de/ed/studium/studienangebot/power-engineering-m-sc/>

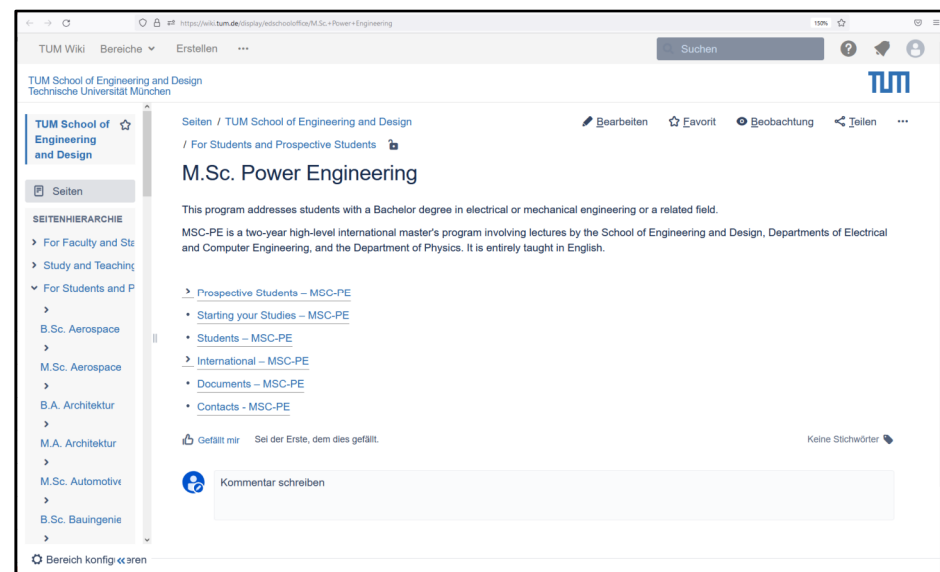


The screenshot shows the homepage for the Power Engineering M.Sc. program. On the left is a blue sidebar with a list of engineering disciplines. The main content area features the title 'Power Engineering M. Sc.' followed by a paragraph describing the program as an entirely English-language, highly international master's degree. Below this is a video player with a red play button and a 'More Info' link. The video shows two students, Himali and Siddharth, talking about their studies. At the bottom of the video player are buttons for 'Activate once' and 'Activate permanently'. To the right of the video player is a section titled 'Studying Power Engineering at TUM'.

+

Wiki

<https://wiki.tum.de/display/edschooloffice/M.Sc.+Power+Engineering>

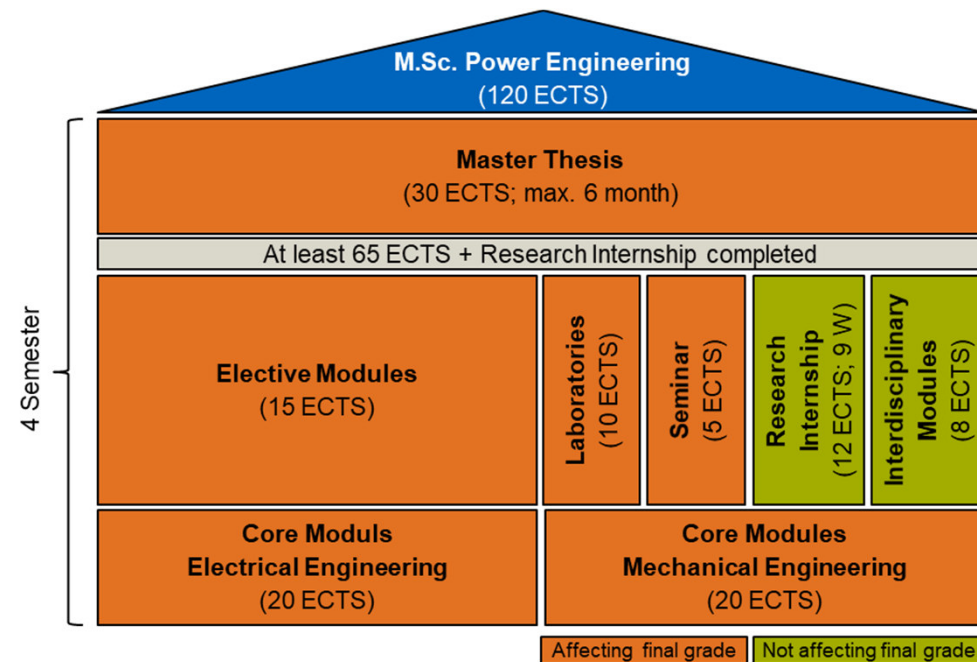


The screenshot shows the Wiki page for the Power Engineering M.Sc. program. The page is titled 'M.Sc. Power Engineering' and includes a description of the program as a two-year high-level international master's program. Below the description is a list of links for prospective students, including 'Starting your Studies - MSC-PE', 'Students - MSC-PE', 'International - MSC-PE', 'Documents - MSC-PE', and 'Contacts - MSC-PE'. There is also a section for 'Gefällt mir' (I like it) and a 'Kommentar schreiben' (Write comment) button.

MSC-PE Program Design - Institutions

- TUM School of Engineering and Design
- TUM School of Computation, Information and Technology
- TUM School of Natural Sciences (Physics)
- TUM School of Management

MSC-PE Program Design



Core Modules Electrical Engineering

Source: Wiki page „Students – MSC-PE“ (Status 30 June 2023)

Semester	Module ID	Module name Module Description	Homepage	Responsible for the module	Lecturer(s)	School	Credits	Format (P = In presence H = Hybrid O = Online)	Additional information
Winter	EI8028	Electrical Machines	https://www.epe.ed.tum.de/ewtllehre/mscei/ei8028/	Herzog		ED	5	In presence	
Winter	EI8029	Energy Systems and Energy Economy Energy Systems and Energy Economics (from SS 2023)		Goebel	Dr Tzscheuschler	ED	5		
Winter	EI8030	High Voltage Technology - Fundamentals		N.N.		ED	5		
Winter	EI8031	Power Electronics for Distributed Energy Systems	https://www.epe.ed.tum.de/eal/courses/veranstaltungen/pe/	Heldwein		ED	5		
Winter	EI8032	Power Transmission Systems		Witzmann		ED	5		
Winter + Summer	EI80004	Sustainable Mobility		Hamacher		ED	5		
Summer	EI8033	Energy Storage now Battery Storage		Jossen		ED	5		

- 20 ECTS
- Free choice
- Repeatable
- Substitutable
- More than 4 courses
→ as Elective Modules

Core Modules Mechanical Engineering

Source: Wiki page „Students – MSC-PE“ (Status 30 June 2023)

Semester	Module ID	Module name Module Description	Homepage	Responsible for the module	Lecturer(s)	School	ECTS	Format (P = In presence H = Hybrid O = Online)	Additional information
Winter	MW1420	Advanced Control	https://www.epc.ed.tum.de/en/rt/study-teaching/lectures/advanced-control/	Kotyczka		ED	5	P	
Winter	MW1421	Dynamics of Mechanical Systems	https://www.mec.ed.tum.de/en/am/courses/	Rixen	Daniel Rixen, Arian Kist	ED	5	H	
Winter	MW1419	Thermodynamics in Energy Conversion	https://www.epe.ed.tum.de/en/es/education/lectures/thermodynamics-in-energy-conversion/	Spliethoff		ED	5	P	
Summer	MW1532	Thermal Power Plants	https://www.epe.ed.tum.de/en/es/education/lectures/thermal-power-plants/	Spliethoff		ED	5	P	
Summer	MW1581	Fluid Machinery		Gümmer		ED	5		
Summer 2023	ED110101	Turbomachinery							
Winter + Summer	MW1354	Renewable Energy Technology I & II	https://www.epe.ed.tum.de/en/es/education/lectures/renewable-energy-technology-i/ https://www.epe.ed.tum.de/en/es/education/lectures/renewable-energy-technology-ii/	Spliethoff		ED	6	P	
Winter + Summer	MW2152	Modeling, Control and Design of Wind Energy Systems		Bottasso		ED	5	P	

- 20 ECTS
- Free choice
- Repeatable
- Substitutable
- More than 4 courses
→ as Elective Modules

Elective Modules

Source: wiki page „Students – MSC-PE“ (Status 09 Oct 21)

Semester	Module ID	Module name Module Description	Homepage	Responsible for the module
WS	E70860	Integration of Renewable Energies		Hamacher
SS	E7490	Mathematical Modelling of Complex Systems in the Field of Energy		Hamacher
WS	MW0799	Introduction to Nuclear Energy		Macián-Juan
until WS 22/23	MW1364	Internal Combustion Engines	https://www.mos.ed.tum.de/mas/lehre/veranstaltungen/vorlesungen-sommersemester/internal-combustion-engines/	Jaensch
WS	E70740	Nanotechnology for Energy Systems		Gagliardi
WS SS2024	MW1808	Nonlinear Control	https://www.epc.ed.tum.de/en/study-teaching/lectures/nonlinear-control/	Kotyczka
SS	Ph2068	Fuel Cells in Energy Technology		Schindler
WS suspended	BGU42010	Civil Engineering in Energy Technology		Mensinger, Fischer, Cudmani
WS/SS	MW2228	Aeroelasticity		Bottasso
SS	E71013	System Design for the Internet of the Things	https://www.oe.oit.tum.de/ess/lehre/sommersemester-2022/vorlesung-system-design-for-the-internet-of-things/	Steinhorst
WS	E70140	Optimal Control and Decision Making	https://campus.tum.de/nonlinear/Livestream/Detail?sessionId=650271002&sprache=1	Buss
WS suspended	VW001255	Lecture Series Renewable Energy Systems in the Global South		Seitz
SS	IN2305	Cyber-Physical Systems		Althoff
SS	MW0868	Modeling and Reduction of Complex Systems	https://www.epc.ed.tum.de/en/study-teaching/lectures/modeling-and-reduction-of-complex-systems/	Kotyczka
WS	BV460017	Hydro Power and Energy Storage		Rüther
WS/SS	E71069	Reliability of Electric Drives	https://www.epe.ed.tum.de/en/lehre/msc/ele7110/	Kammermann / Bokashevskiy
WS	E76172	Renewable Energy Systems: Power Electronics, Modeling and Control		Hadi
WS	E80009	Active Distribution Grids		Hamacher
WS	ED180001	New Technologies in the Energy Transition of Shipping		Dr. Lehner
WS	ED180003	Mathematical Modeling for expansion and dispatch planning in modern energy systems		Hamacher
from SS2023	ED150013	Sustainable Mobile Powertrains		Jaensch
from SS2023	E71495	Power Electronics and Drives for Electric Vehicles		Heldwein
WS/SS	ED180013	Energy Informatics		Goebel

+
Core Modules Electrical Engineering
+
Core Modules Mechanical Engineering

- 15 ECTS
- Free choice
- Repeatable

Laboratories („Labs“)

Source: wiki page „Students – MSC-PE“ (Status 09 Oct 21)

Semester	Module ID	Module name Module Description	Homepage	Responsible for the module
WS	MW2134	Computational Thermo-Fluid Dynamics		Polifke
suspended	MW2267	Design of Wind Turbines	https://www.epe.ed.tum.de/wind/education/praktikum-on-design-of-wind-turbines/	Bottasso
SS	EI73631	Electrical Energy Storage Lab		Jossen
SS	EI78050	Project laboratory Electrochemistry and Biosensors	https://www.ee.cit.tum.de/en/teaching/project-laboratory-electrochemistry-and-biosensors/	Wolfrum
suspended	EI78020	Embedded Control Systems Laboratory		Müller-Grätschneider
WS	EI7467	Interdisciplinary Project Internship Concept Development of a Renewable Energy System in a Developing Country		Hamacher
suspended	EI8035	Laboratory Course High Voltage Technology		Koch
WS/SS	MW1869	Laboratory Course Energy Systems for MSPE	https://www.epe.ed.tum.de/en/es/education/laboratory-courses/laboratory-course-energy-systems-for-mspe/	Splithoff
suspended	EI8037	Power Generation Lab		Goebel
WS/SS	EI78019	Practical Course Control of Low-Power Automotive Drives	https://www.epe.ed.tum.de/ea/courses/veranstaltungen/jccpad/	Heldwein
WS/SS (offered SS2023)	EI80006	Practical Course Power Electronics DC/DC Converter		Heldwein
WS/SS	EI80003	Practical Course Simulation and Optimization of Mechatronic Drive Systems	https://www.epe.ed.tum.de/ea/courses/veranstaltungen/jpcsdmspe/	Heldwein
WS/SS	EI7417	Project Course Drive Systems and Power Electronics		Heldwein
SS	EI80008	Project Laboratory on Distribution Grid Simulation		Witzmann
WS/SS	EI74831	Project Lab Renewable und Sustainable Energy Systems		Hamacher
WS/SS	EI78022	Simulation and Commissioning of Electrical Actuators	https://www.epe.ed.tum.de/ew/lehre/mce/ei710900/	Kammermann
WS/SS	MW1277	Simulation of Thermo fluids with Open Source Tools		Polifke
WS	MW2285	Wind Tunnel Testing of Wind Turbines		Bottasso
WS/SS	ED180012	Design of Wind Farms		Bottasso

- 10 ECTS
- Free choice
- Centralized allocation of places
 - Number of credits
 - Number of semesters
 - Choice prioritization
 - ...
- Focus on core modules recommended in semester 1

Seminar

Source: wiki page „Students – MSC-PE“ (Status 09 Oct 21)

Seminars (5 ECTS credits required)					
Semester	Module Number	Module name	Professor	Dep.	ECTS
WS/SS	EI8040	Seminar on Energy Systems and Energy Economy	Hamacher	ED	5
WS/SS	EI8044	Seminar on Renewable and Sustainable Energy Systems	Hamacher	ED	5
WS/SS	EI8016	Seminar on Electrical Actuators	Herzog	ED	5
WS/SS	EI8041	Seminar on High Voltage Technology	Koch	ED	5
WS/SS	EI8038	Seminar on Power Transmission	Witzmann	ED	5
WS/SS	EI8039	Seminar on Intelligent Methods in Mechatronics	Kennel	ED	5
WS/SS	EI8042	Seminar on Energy Storage Technologies	Jossen	ED	5
WS/SS	EI77001	Seminar on Embedded Systems and Internet of the Things	Steinhorst	EI	5
WS/SS	MW1813	Seminar on Thermal Energy Systems	Splithoff	ED	5
WS/SS	MW2089	Seminar on Nuclear Safety Principles	Macián-Juan	ED	5
WS/SS	EI7770	Seminar on Electrophysical Problems in Microsystem Technology	Schrag	EI	5

- 5 ECTS
- Free choice
- Substitutable

Interdisciplinary Modules

Source: wiki page „Students – MSC-PE“ (Status 14 Oct 21)

Interdisciplinary Modules (8 ECTS Credits)

You have to earn eight credits from non power-engineering subjects. The choice is yours. In particular, modules from other departments / schools and also language courses are accepted, too.

Some suggestions are:

- Language Courses
- EI04004 Strategic Management for Engineers, Prof. Sauerbrey
- MW2223 Soft Skills Training within the lab "Simulation of Thermofluids with Open Source Tools" Prof. Polifke
- POL67000 or POL67001 Digital Sustainability, Transformation of, by and for the TUM, Prof. Wurster, Dr. Siewert

Research Internship

Source: wiki page „Students – MSC-PE“ (Status 04 Oct 21)

Research Internship (12 ECTS Credits)

The nine-week research internship has to be carried out at a **chair of TUM expert examiners**. For MSC-PE these are **all university professors, lecturers and junior fellows who teach a Core Module or a Elective Module**. Furthermore, the following professors are nominated as expert examiners for MSC-PE by the Examination Board: **Prof. Kreupl, Prof. Alexander Koch, Prof. Lienkamp, Prof. Sattelmayer, Prof. Zäh, Prof. Armanini, Prof. Oksanen, Prof. Rudolf Neu.**

More information and relevant forms can be found on the wiki page [Documents – MSC-PE](#).

- In industry with an agreement of a professor
- During second or third semester (usually during the semester break)
- Full-time
- Written report
- Presentation of the results
- Only one Research Internship can be counted

Master Thesis

Source: wiki page „Students – MSC-PE“ (Status 09 Oct 21)

Master Thesis (30 Credits)

The **six-month** Master Thesis concludes the MSC-PE Program and it also has to be carried out at a **chair of TUM expert examiners**. For MSC-PE these are **all university professors, lecturers and junior fellows who teach a Core Module or a Elective Module**. Furthermore, the following professors are nominated as expert examiners for MSC-PE by the Examination Board: **Prof. Kreupl, Prof. Alexander Koch, Prof. Lienkamp, Prof. Sattelmayer, Prof. Zäh, Prof. Armanini, Prof. Oksanen, Prof. Rudolf Neu**.

Students can start the master thesis if they have passed **65 credits** from course work **plus the research internship**. For the registration of the Master Thesis students have to contact the Study & Teaching Office ([Contacts - MSC-PE](#)). The designated **form** can be found on the wiki page [Documents – MSC-PE](#).

- In industry is also possible with the agreement of a professor
- Maximum duration: Six months
- Written thesis of about 60 to 100 pages
- Presentation of the results
- May be repeated once with a different topic if not passed

Academic Progress Check

- 10 ECTS from Core Modules Electrical Engineering
 - 10 ECTS from Core Modules Mechanical Engineering
 - 30 ECTS by end of 3rd semester
 - 60 ECTS by end of 4th semester
 - 90 ECTS by end of 5th semester
 - 120 ECTS by end of 6th semester
- } → by end of the 2nd semester

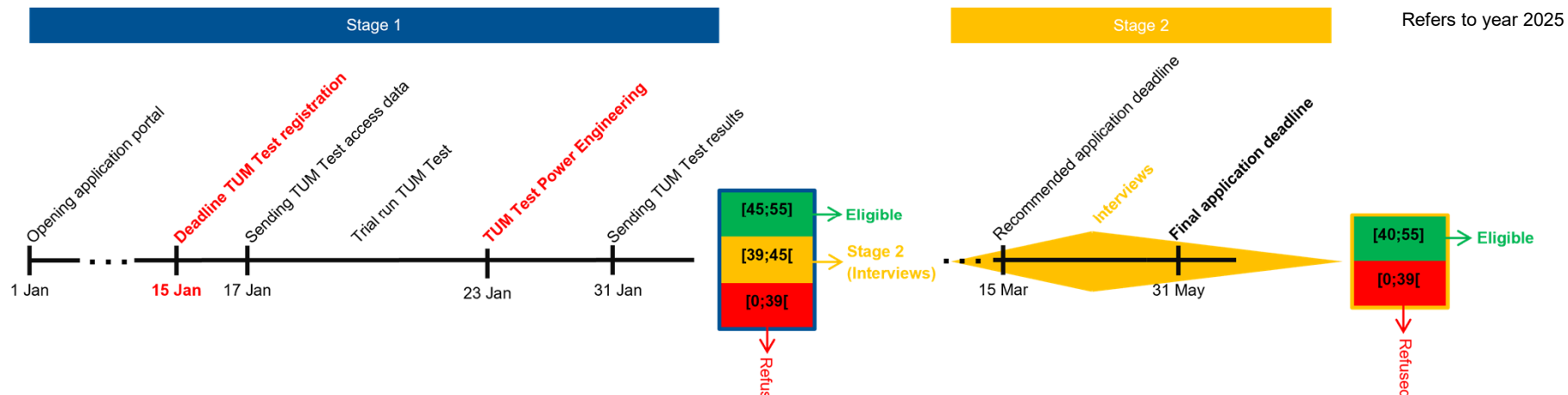
Maximum 45 credits per semester

Requirements

- H+ rated ([Anabin](#)) Bachelor degree or equivalent in electrical or mechanical engineering, with a strong focus on power engineering and excellent grades
→ **Outstanding expertise in the fields of electrical and mechanical engineering**, preferably in the field of power engineering
- **Bachelor degree better than 2.5**
- **TUM Test M.Sc. Power Engineering** with a score of at least **39 points**
(only relevant for applicants who have obtained their Bachelor's degree in a country outside the scope of the "[Lisbon Convention](#)")
- English language skills at level B2

Application & Aptitude Assessment

For applicants outside the scope of the "Lisbon Convention" → TUM Test Power Engineering



Stage 1 → TUM Test Power Engineering (max. 55 points)

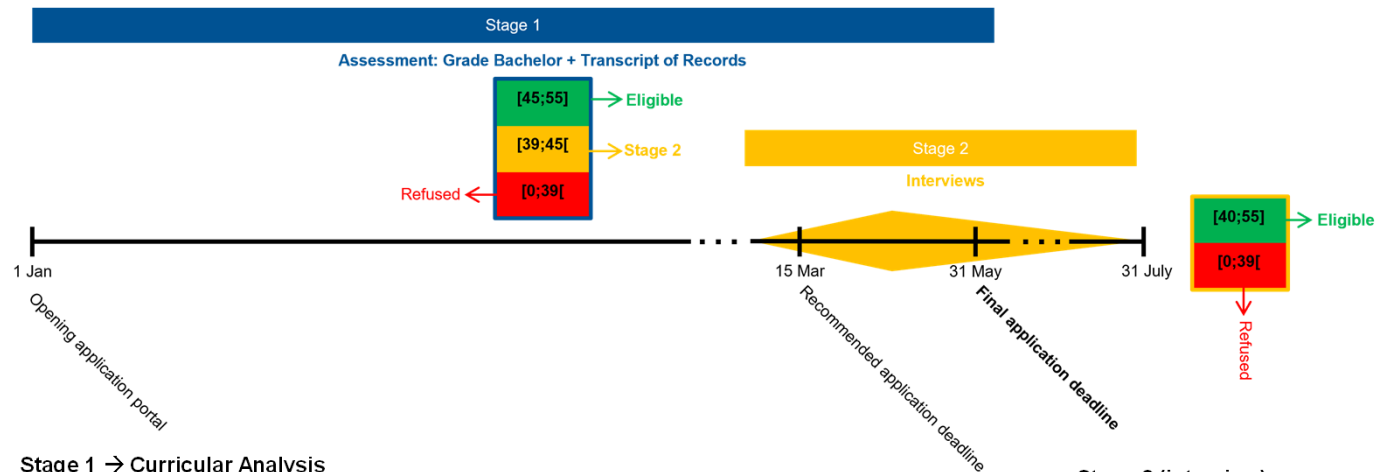
- Subjects
 - Mathematics
 - Electrical Engineering
 - Mechanical Engineering
- ≥ 45 points → direct admission
- ≥ 39 and < 45 points → Stage 2 (interview)

Stage 2 (interview):

- Motivation for MSC-PE (max. 15 points)
 - Expertise and ability to do scientific work (max. 30 points)
 - Communication skills in the English language (max. 10 points)
- Mean value interview and score stage 1 → ≥ 40 points: admission

Application & Aptitude Assessment

For applicants inside the scope of the "Lisbon Convention" → Curricular Analysis



Refers to year 2025

Stage 1 → Curricular Analysis

Grade Bachelor degree (from best 150 ECTS !)

- Subjects during your Bachelor degree
 - Mathematics
 - Electrical Engineering
 - Mechanical Engineering
- ≥ 45 points → direct admission
- ≥ 39 and < 45 → Stage 2 (interview)

- max. 25 points; at least 2.5
- max. 30 points
- max. 12 point (≥ 30 ECTS)
- max. 9 points (≥ 45 ECTS)
- max. 9 points (≥ 45 ECTS)

Stage 2 (interview):

- Motivation for MSC-PE (max. 15 points)
 - Expertise and ability to do scientific work (max. 30 points)
 - Communication skills in the English language (max. 10 points)
- Mean value interview and score stage 1 → ≥ 40 points: admission

Application & Aptitude Assessment

Stage 1

- Grade Bachelor degree (from best 150 ECTS !) → max. 25 points; at least 2,5
- Subjects during your Bachelor degree → max. 30 points
 - Mathematics → max. 12 point (≥ 30 ECTS)
 - Electrical Engineering → max. 9 points (≥ 45 ECTS)
 - Mechanical Engineering → max. 9 points (≥ 45 ECTS)
- ≥ 45 points → direct admission
- ≥ 39 , and < 45 → Stage 2 (interview)

Stage 2 (interview):

- Motivation for MSC-PE (max. 15 points)
- Expertise and ability to do scientific work (max. 30 points)
- Communication skills in the English language (max. 10 points)

Mean value interview and score stage 1 → ≥ 40 points: admission

Professional Perspective

Source: graduate survey 2022/2023

- 93% employed within on year of graduation (appr. 90% within 4 month)
- 89% deperently employed
- 74% employed for an indefinite period
- 100% fulltime
- 12% PhD
- 65% large company (> 500)
- 23% IT, 27% automotive, 4% construction, 5% plant engineering, 41% agriculture and food industry
- 44% R&D, 4% production, 12% planning, 20% consulting, 12% sales, 8% IT, 8% project management, 4% quality assurance, 4% data science
- 50%: 50 – 60 TEUR, 20%: 70 – 80 TEUR
- 43 % Munich region, 19% Bavaria, 19% Germany

Welcome @ MSC-PE

Dr. Markus Eblenkamp

Program Manager

Garching (Munich), 25 March 2025

