Technical developments are becoming increasingly complex and are based to a large extent on mathematical principles. Engineers are therefore dependent on powerful hardware and software and mastery of computer science methods as key skills. This is the only way they can successfully develop new products, compare technical solutions or predict the effects of design decisions. Computational Engineering was developed on the basis of these insights and combines computer science, mathematics and engineering as interdisciplinary, equal teaching content in one course of study. The field is a globally recognized discipline that deals with solving physical problems in science and technology using mathematical models, computer and software systems.

The Master's degree program is designed to allow students to pursue studies both in computer science and in an engineering field of their choice. For this reason, applicants are required to have knowledge in both of these areas. Ideally, students should have either a Bachelor's degree in Computational Engineering or an engineering degree with a strong computer science component. A good mathematical background is essential. The program requires a minimum of 2 years of engineering mathematics at the university level. Additionally, knowledge in numerical mathematics is strongly recommended. The Master's degree program takes a minimum of four semesters. The last semester focuses on preparation of the Master's thesis. The thesis is intended to introduce students to research work at the university.

As the degree program has an international perspective, both German and English modules are offered. Examinations may be taken in either English or German and the Master's thesis may be written in English. This means that international students may complete the degree program entirely in English.

Candidates must choose a technical application field (TAF) when they apply. We strongly advise that you contact the program coordinator or the TAF coordinator for more information about the technical application fields. A description of all TAFs available in the current academic year is available here.

The Master's degree program in Computational Engineering, along with two partner programs at Technische Universität München, forms the basis for the Bavarian Graduate School of Computational Engineering (BGCE) Elite degree program. Students may apply for this after completing the first semester of the regular Master's degree program. The highly project-specific and research-oriented modules offered in the Elite program add even more possibilities to those already available in the regular program. In addition to collaboration between partner programs, shared soft skills courses are also held regularly.

The components of the Master's degree program in Computational Engineering are one seminar, modules in the three main areas – mathematics, computer science and the technical application field (TAF) – and the Master's thesis.

There is a standard study plan for each TAF, although all modules in the Master's degree program are elective. Students can choose their modules from the module catalogues of various Master's degree programs in computer science, engineering, applied mathematics and physics. In order to participate in the Elite degree program students must complete 30 additional ECTS credits.

Elective modules in mathematics [30 ECTS]

Mathematics modules can be chosen from the applied mathematics module catalogs or from the Faculty of Engineering. The modules must be mathematics based.

Elective modules in computer science [30 ECTS]

Students can choose modules offered by the Department of Computer Science for the Master's degree program in Computer Science.

Elective modules in the technical application field, TAF [30 ECTS]

In this area students can choose modules from all Master's degree programs at the Faculty of Engineering, with the exception of modules offered by the Department of Computer Science.

Seminar [5 ECTS]

The seminar is part of one of the elective subjects listed above. Students can therefore choose a seminar from a Master's degree program at the Department of Computer Science, applied mathematics or another module from the Faculty of Engineering that is related to the TAF.

Master's thesis [30 ECTS]

Students can register for the Master's thesis at the Examinations Office as soon as they have successfully completed 70 ECTS credits. The thesis requires approximately 810 hours of work and must be completed within six months after registration. The topic of the thesis must be related to the subjects that the student has studied over the course of the Master's degree program. All students are usually assigned one supervisor for their thesis. The Master's thesis may involve regular meetings with the supervisor and/or members of a larger research group. It may be written in English. An oral presentation of the results lasting 30 minutes with a subsequent discussion form part of the assessment.

Elite program [30 ECTS]

'Do more – get more!' is the motto of the BGCE Elite degree program. This means that students must complete an extra 30 ECTS credits within the standard duration of studies. These credits are divided into three groups, with 10 ECTS credits each for different subject-related modules, soft skills and an additional project. The subject-related modules include specific summer schools, compact courses and the regular workshop where participants take part in discussions with students from the partner programs (research day). Soft skills modules include management skills, teaching and academic writing. For the project, students generally develop software to solve a specific practical problem as a team.

15.07.

Englisch

Our Student Advice and Career Service (IBZ) is the central point of contact for all questions about studying and starting a degree programme. Our Student Service Centres and subject advisors support you in planning your studies.

Degree: Master of Science
Duration of studies in semester: 4
Start of degree program: Winter semester
Study location: Erlangen
Number of students: 250-600
Subject group: Engineering sciences
Special ways to study: International degree program, Double degree program
Teaching language: completely in English
Admission Requirements: Qualification assessment
Admission requirements (first semester): Qualification assessment
Application deadline winter semester: 15.07.
Content-related admission requirements: Englisch
German language skills for international applicants: No DSH, English (level B2, CEFR)