Course-specific structure

Computational Science and Engineering (M.Sc.)

1. Semester 33 LP
2. Semester 30 LP
3. Semester 27 LP
4. Semester 30 LP

Elective Modules

- Language Skills 12 LP

LP: credit point according to ECT system (Unit for learning, preparation and postprocessing efforts, 1 credit point corresponds to about 30 hours)

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### Degree

Master of Science (M.Sc.)

### Type of Program

graduate (with a second academic degree) 
one major subject degree (not combinable)
language: English, single modules in German

The entire course may be completed in English language.

### Duration

4 semesters

### Start Date

in winter semester (Oct. 1) and in summer semester (Apr. 1); specialization CP: start only in winter semester, specializations CEE and CME: start recommended in winter semester

### Start-up support

Assistance during the start of studies and orientation in Germany with the help of mentoring from students for students

### Fields of Study

Engineering / Electrical Engineering / Mechanical Engineering 
Natural Sciences / Physics

### Formal Requirements

- Completion of a first academic degree in Computational Science and Engineering, Electrical Engineering, Information Technology, Mechanical Engineering, Physics with at least 180 credit points or another equivalent qualification; with at least 85% of the CGPA (Cumulative Grade Point Average) or a comparable grade or Graduate Aptitude Test in Engineering (GATE) with at least 500 points
- Mother tongue English or proof (not older than two years) of sufficient English language skills with TOEFL IBT with at least 90 points or IELTS with at least 6.5 points
- solid knowledge in mathematics: especially linear algebra, calculus (integral, vector ...), numerics and stochastics
- solid skills in programming language, e.g. C/C++, Fortran, Java, Python & solid knowledge in computer architecture, operating systems and computer networks
- proof of profound knowledge: CEE: Electromagnetic Fields and Waves (at least 3 credit points), Mathematics (at least 18 credit points), Programming / Practical Computer Science (at least 6 credit points) / CME: Mathematics (at least 18 credit points), Technical Mechanics (at least 18 credit points), Thermodynamics (six credit points), Fluid Mechanics (6 credit points) and Programming (at least 9 credit points) / CP: Quantum Mechanics (at least 9 credit points), Electrodynamics and Optics (at least 6 credit points), Statistical Physics (at least 6 credit points) and Mathematics (at least 18 credit points)

### Purpose and Objective

Computational Science and Engineering is a new, rapidly growing field that is, in addition to the major subject, based on Applied Mathematics and Computer Science. The aim of the course is the acquisition of skills to carry out computer simulations of technical and natural systems in Electrical or Mechanical Engineering as well as Physics based on a sound knowledge of numerical methods. Numerical Simulations allow the work on fields that are inaccessible to conventional tests and investigation methods. As computers get more powerful, the scope for modeling and simulation is constantly expanding. In many cases, the design process is already happening only inside the computer.

### Advanced Qualification Options

graduate to Dr.-Ing. or Dr. rer. nat.

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### Premises for the Study

You have profound knowledge in mathematics and natural sciences as well as advanced English language skills. You are particularly interested in scientific-technical and engineering-based issues as well as research-oriented work.

### Content of the Master Program

In the first three semesters, you deepen your knowledge in numerical analysis, partial differential equations, as well as high-performance computing and your classes from the respective module catalog. There are compulsory German courses for all majors. German-speaking students select another language. The 4th semester is for the master thesis.

### Special Features

The course is offered in English language and is therefore equally suitable for English-speaking international students and for German-speaking students who want to develop and apply their English language skills intensively.

### Career Prospects

Within this course, you will acquire a broad range of skills that is indispensable for engineers and physicists with a focus on simulation and numerical computing methods. The university master's degree offers best possibilities for a leading or researcher position in the field of engineering in Germany and abroad, or to enter a doctoral program. The ever-growing demand for engineers and physicists with profound knowledge of computational mathematics opens up prospects for the future with excellent career opportunities.