Course-specific structure

Introduction to Numerical Mathematics
9 LP

Master Thesis Computational Science and Engineering
30 LP

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)

Course-specific structure for the master course Computational Science and Engineering

Specialization Computational Electrical Engineering – starting in the winter semester

Elective Modules Specialization
36 LP

Introduction to High Performance Computing
9 LP

Computational Electromagnetics
9 LP

Analysis and Numerics of Partial Differential Equations
9 LP

Software Lab Project
6 LP

Course overview for the specialization Computational Electrical Engineering starting in the summer semester and the specializations Computational Mechanical Engineering and Computational Physics are available on www.ief.uni-rostock.de/?L=1 - section "Studies"
Computational Science and Engineering (M.Sc.)

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)

Advanced Qualification Options
graduate to Dr.-Ing. or Dr. rer. nat.

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 allows 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.

University of Rostock