| | | |
|---|---|---|
| **Modulbezeichnung:** | **Basics for Computational Engineering (BCE)** (Basics for Computational Engineering) | **15 ECTS** |
| Modulverantwortliche/r: | Dietmar Fey | |
| Lehrende: | Dietmar Fey | |

| | | |
|---|---|---|
| Startsemester: WS 2021/2022 | Dauer: 1 Semester | Turnus: jährlich (WS) |
| Präsenzzeit: k.A. Std. | Eigenstudium: 450 Std. | Sprache: Englisch |

**Lehrveranstaltungen:**

Lecture Basics for Computational Engineering (WS 2021/2022, Vorlesung, 4 SWS, Dietmar Fey)
Exercises Basics for Computational Engineering (WS 2021/2022, Übung, 4 SWS, Dietmar Fey)

**Inhalt:**

The lecture is divided into two parts:
i) Basics of computer architecture, i.e. how a computer works, its design and structure.
- Principle of digital electronics and Boolean logic
- Basic arithmetic circuits
- Microprogramming, CISC and RISC architectures
- Cache and memory architecture
- Multi-core architectures and introductin in GPUs

ii) Introduction to parallel computer architecture and its applications.
- Programming of memory-coupled multi-core architectures with OpenMP
- Programming of message-coupled computer systems with MPI
- Limits of parallel computing (Amdahl's Law)
- Introduction to Finite-Difference-Time-Domain methods

**Lernziele und Kompetenzen:**

Expertise
- Knowledge:Students can memorize and reproduce knowledge. They know concrete details and words, definitions, facts, data, rules, theories, features, criteria, procedures, etc.
- Understanding:Students can tell examples, interpret questions or reproduce a problem in their own words.
- Applying:Students can solve a new problem by transferring knowledge.
- Analyzing:Students can divide a problem into single parts to understand a problem. They can find contradictions, connections, they can conclude and differ between facts and interpretations.
- Learn and method competency:

Ability to apply certain learn and work methods to develop other competencies, especially required for expertise.
- Self competency:Ability to further develop the own life by oneself and responsibly model the social, cultural and employment context.
- Social competency:Ability to work goal oriented in a team. To recognize interests in social situations, and to analyze them rationally and responsibly. To discuss and to model the working and living world.

**Literatur:**

On StudOn

**Studien-/Prüfungsleistungen:**

Allgemeine fachspezifische Grundlagen (digital) - Basics for Computational Engineering (Prüfungsnummer: 86551)
(englische Bezeichnung: Basics for Computational Engineering)

Studienleistung, Klausur, Dauer (in Minuten): 90 Prüfungssprache: Englisch

Erstablegung: WS 2021/2022, 1. Wdh.: WS 2021/2022
1. Prüfer: Dietmar Fey