

Subdivided Module Catalogue for the Module studies (Master)

Computer Science

Examination regulations version: 2019 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Computer Science



Abbreviations used

Course types: $\mathbf{E} = \text{field trip}$, $\mathbf{K} = \text{colloquium}$, $\mathbf{O} = \text{conversatorium}$, $\mathbf{P} = \text{placement/lab course}$, $\mathbf{R} = \text{project}$, $\mathbf{S} = \text{seminar}$, $\mathbf{T} = \text{tutorial}$, $\ddot{\mathbf{U}} = \text{exercise}$, $\mathbf{V} = \text{lecture}$

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: A = thesis, LV = course(s), PL = assessment(s), TN = participants, VL = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

15-May-2019 (2019-36)

27-Jun-2019 (2019-41)

14-Nov-2019 (2019-52)

22-Jan-2020 (2020-13)

o6-May-2020 (2020-39)

22-Jul-2020 (2020-57)

17-Dec-2020 (2020-110)

10-Mar-2021 (2021-17)



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o9-Jun-2021 (2021-58)
22-Dec-2021 (2021-85)
05-Jul-2022 (2022-52)
31-Jan-2023 (2022-86)
15-Jun-2023 (2023-58)
13-Dec-2023 (2023-107)
07-Aug-2024 (2024-82)
22-Jan-2025 (2025-1)
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This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.



The subject is divided into

| Abbreviation | Module title | | Method of grading | page |
|--|---|----|-------------------|------|
| Summer Term 2019 | | | | |
| 10-l=3D-161-m01 | 3D Point Cloud Processing | 5 | NUM | 12 |
| 10-l=AA-152-m01 | -l=AA-152-mo1 Advanced Automation | | | |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-l=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-l=AKHCl-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-l=AKIS-161-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 29 |
| 10-I=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-172-m01 | Selected Topics in IT Security | 5 | NUM | 34 |
| 10-I=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-I=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-I=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-l=NLP-182-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 47 |
| Performance Engineering and Benchmarking of Computer Systems | | 5 | NUM | 49 |
| 10-I=PRAK-161-m01 | Practical course - Current Topics in Computer Science | 10 | B/NB | 50 |
| 10-I=SEM3-161-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 54 |
| 10-I=SEM4-161-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 57 |
| 10-l=SSS-172-m01 | Security of Software Systems | 5 | NUM | 60 |
| 10-l=ST-161-m01 | Discrete Event Simulation | 8 | NUM | 63 |
| 10-I=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Winter Term 2019 | | | | |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| 10-l=3D-161-m01 | 3D Point Cloud Processing | 5 | NUM | 12 |
| 10-I=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-I=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-I=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-I=AKHCI-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-I=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-I=AKIS-161-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 29 |
| 10-I=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-172-m01 | Selected Topics in IT Security | 5 | NUM | 34 |
| 10-I=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-I=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |



| 10-l=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
|---------------------------------------|---|--------|--|--|
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-l=NLP-182-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 47 |
| 10-l=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-161-m01 | Practical course - Current Topics in Computer Science | 10 | B/NB | 50 |
| 10-I=SEM3-161-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 54 |
| 10-I=SEM4-161-mo1 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 57 |
| 10-I=SSS-172-m01 | Security of Software Systems | 5 | NUM | 60 |
| 10-I=ST-161-m01 | Discrete Event Simulation | 8 | NUM | 63 |
| Summer Term 2020 | | | | |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| 10-l=3D-161-m01 | 3D Point Cloud Processing | 5 | NUM | 12 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-I=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-I=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-I=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-I=AKHCI-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-I=AKIS-161-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 29 |
| 10-I=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-172-m01 | | | NUM | 34 |
| 10-I=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-I=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-I=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-I=NLP-182-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 47 |
| 10-l=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-161-m01 | Practical course - Current Topics in Computer Science | 10 | B/NB | 50 |
| 10-I=SEM3-161-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 54 |
| 10-I=SEM4-161-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 57 |
| 10-l=SSS-172-m01 | Security of Software Systems | 5 | NUM | 60 |
| 10-l=ST-161-m01 | Discrete Event Simulation | 8 | NUM | 63 |
| Winter Term 2020 | • | Į. | · | |
| 10-l=3D-161-m01 | 3D Point Cloud Processing | 5 | NUM | 12 |
| 10-I=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| | | | | |
| 10-I=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-I=APA-161-m01 10-I=AKA-161-m01 | Approximation Algorithms Selected Topics in Algorithms | 5 5 | NUM NUM | 20 |
| | | | | |
| 10-I=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-I=AKA-161-m01 10-I=AKES-161-m01 | Selected Topics in Algorithms Selected Topics in Embedded Systems | 5 5 | NUM NUM | 20 |



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|-------------------------|--|----|--------------|----------|
| 10-l=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-172-m01 | Selected Topics in IT Security | 5 | NUM | 34 |
| 10-l=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-l=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-l=NLP-182-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 47 |
| 10-l=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-161-m01 | Practical course - Current Topics in Computer Science | 10 | B/NB | 50 |
| 10-I=SEM3-161-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 54 |
| 10-l=SEM4-161-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 57 |
| 10-l=SSS-172-m01 | Security of Software Systems | 5 | NUM | 60 |
| 10-l=ST-161-m01 | Discrete Event Simulation | 8 | NUM | 63 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Summer Term 2021 | | | <u> </u> | |
| 10-l=3D-161-m01 | 3D Point Cloud Processing | 5 | NUM | 12 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-I=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-l=AKHCl-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-l=AKIS-161-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 29 |
| 10-l=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-172-m01 | Selected Topics in IT Security | 5 | NUM | 34 |
| 10-l=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-I=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-I=NLP-182-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 47 |
| 10-I=PEB-182-mo1 | Performance Engineering and Benchmarking of Computer Sy- | | NUM | |
| 10-1-1 FD-105-III01 | stems | 5 | MOM | 49 |
| 10-I=PRAK-161-m01 | Practical course - Current Topics in Computer Science | 10 | B/NB | 50 |
| 10-l=SEM3-161-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 54 |
| 10-I=SEM4-161-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 57 |
| 10-l=SSS-172-m01 | Security of Software Systems | 5 | NUM | 60 |
| 10-l=ST-161-m01 | Discrete Event Simulation | 8 | NUM | 63 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Winter Term 2021 | | - | - | |
| 10-l=3D-212-m01 | 3D Point Cloud Processing | 5 | NUM | 13 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
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| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
|-------------------------|--|----|---------|----|
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-l=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-l=AKHCl-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-l=AKIS-212-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 30 |
| 10-l=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-l=AKITS-212-m01 | Selected Topics in IT Security | 5 | NUM | 35 |
| 10-l=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-l=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| L DED . O | Performance Engineering and Benchmarking of Computer Sy- | | NII 184 | |
| 10-l=PEB-182-m01 | stems | 5 | NUM | 49 |
| 10-I=PRAK-212-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 51 |
| 10-l=SEM3-212-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 55 |
| 10-I=SEM4-212-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 58 |
| 10-l=SSS-212-m01 | Security of Software Systems | 5 | NUM | 61 |
| 10-l=ST-212-m01 | Discrete Event Simulation | 8 | NUM | 64 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Summer Term 2022 | • | | • | |
| 10-l=3D-212-m01 | 3D Point Cloud Processing | 5 | NUM | 13 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-l=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-l=AKHCl-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-l=AKIS-212-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 30 |
| 10-l=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-l=AKITS-212-m01 | Selected Topics in IT Security | 5 | NUM | 35 |
| 10-l=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-l=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| 10-I=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-212-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 51 |
| 10-I=SEM3-212-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 55 |
| 10-I=SEM4-212-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 58 |
| 10-l=SSS-212-m01 | Security of Software Systems | 5 | NUM | 61 |
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| 10-l=ST-212-m01 | Discrete Event Simulation | 8 | NUM | 64 |
|------------------------|---|--------------|----------|----------|
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Winter Term 2022 | | 1 - 3 | | 1 33 |
| 10-l=3D-212-m01 | 3D Point Cloud Processing | 5 | NUM | 13 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-l=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-I=AKHCI-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-I=AKIS-212-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 30 |
| 10-I=AKIT-161-m01 | Selected Topics in Internet Technologies | | NUM | 32 |
| 10-I=AKITS-212-m01 | Selected Topics in IT Security | 5 | NUM | +- |
| 10-I=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 35 |
| 10-I=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 37 |
| | Selected Topics of Games Engineering | 5 | NUM | 42 |
| 10-l=AGE-191-m01 | | 5 | <u> </u> | 18 |
| 10-I=AKSE-161-m01 | Selected Topics in Software Engineering | 5 8 | NUM | 40 |
| | Performance Evaluation of Distributed Systems | | <u> </u> | 45 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| 10-I=PEB-182-m01 | -I=PEB-182-mo1 Performance Engineering and Benchmarking of Computer Systems | | NUM | 49 |
| 10-l=PRAK-212-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 51 |
| 10-l=SEM3-212-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 55 |
| 10-l=SEM4-212-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 58 |
| 10-l=SSS-212-m01 | Security of Software Systems | 5 | NUM | 61 |
| 10-l=ST-212-m01 | Discrete Event Simulation | 8 | NUM | 64 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Summer Term 2023 | • | | , | |
| 10-l=3D-212-m01 | 3D Point Cloud Processing | 5 | NUM | 13 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-161-m01 | Computational Geometry | 5 | NUM | 16 |
| 10-l=AGE-191-m01 | Selected Topics of Games Engineering | 5 | NUM | 18 |
| 10-l=AKA-161-m01 | Selected Topics in Algorithms | 5 | NUM | 20 |
| 10-l=AKES-161-m01 | Selected Topics in Embedded Systems | 5 | NUM | 23 |
| 10-l=AKHCl-182-m01 | Selected Topics in HCI | 5 | NUM | 25 |
| 10-l=AKII-182-m01 | Selected Topics in Computer Science | 5 | NUM | 27 |
| 10-l=AKIS-212-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 30 |
| 10-I=AKIT-161-m01 | Selected Topics in Internet Technologies | 5 | NUM | 32 |
| 10-I=AKITS-212-m01 | Selected Topics in IT Security | 5 | NUM | 35 |
| 10-l=AKLR-161-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 37 |
| 10-l=AKSE-161-m01 | Selected Topics in Software Engineering | 5 | NUM | 40 |
| 10-l=AKT-161-m01 | Selected Topics in Theory | 5 | NUM | 42 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-I=LVS-161-m01 | Performance Evaluation of Distributed Systems | 8 | NUM | 45 |
| 10-I=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
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| | Performance Engineering and Benchmarking of Computer Sy- | 1 | ĺ | 1 |
|-------------------------|--|-----|------------|-------|
| 10-I=PEB-182-m01 | 5 | NUM | 49 | |
| 10-I=PRAK-212-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 51 |
| 10-I=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| 10-I=SEM3-212-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 55 |
| 10-I=SEM4-212-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 58 |
| 10-l=SSS-212-m01 | Security of Software Systems | 5 | NUM | 61 |
| 10-l=ST-212-m01 | Discrete Event Simulation | 8 | NUM | 64 |
| Winter Term 2023 | | | | - |
| 10-l=3D-232-m01 | 3D Point Cloud Processing | 5 | NUM | 14 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-232-m01 | Computational Geometry | 5 | NUM | 17 |
| 10-I=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-I=AKA-232-m01 | Selected Topics in Algorithms | 5 | NUM | 21 |
| 10-I=AKES-232-m01 | Selected Topics in Embedded Systems | 5 | NUM | 24 |
| 10-l=AKHCl-232-m01 | Selected Topics in HCI | 5 | NUM | 26 |
| 10-l=AKII-232-m01 | Selected Topics in Computer Science | 5 | NUM | 28 |
| 10-I=AKIS-232-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 31 |
| 10-I=AKIT-232-m01 | Selected Topics in Internet Technologies | 5 | NUM | 33 |
| 10-I=AKITS-232-m01 | Selected Topics in IT Security | 5 | NUM | 36 |
| 10-I=AKLR-232-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 38 |
| 10-l=AKT-232-m01 | Selected Topics in Theory | 5 | NUM | 43 |
| 10-l=AGE-232-m01 | Selected Topics in Games Engineering | 5 | NUM | 19 |
| 10-I=AKSE-232-m01 | Selected Topics in Software Engineering | 5 | NUM | 41 |
| 10-l=LVS-232-m01 | Performance Evaluation of Distributed Systems | 5 | NUM | 46 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| | Performance Engineering and Benchmarking of Computer Sy- | | | |
| 10-l=PEB-182-m01 | stems | 5 | NUM | 49 |
| 10-I=PRAK-232-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 52 |
| 10-I=SEM3-232-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 56 |
| 10-I=SEM4-232-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 59 |
| 10-l=SSS-232-m01 | Security of Software Systems | 5 | NUM | 62 |
| 10-l=ST-232-m01 | Discrete Event Simulation | 5 | NUM | 65 |
| 10-I=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Summer Term 2024 | | | | |
| 10-l=3D-232-m01 | 3D Point Cloud Processing | 5 | NUM | 14 |
| 10-I=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-232-m01 | Computational Geometry | 5 | NUM | 17 |
| 10-I=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-I=AKA-232-m01 | Selected Topics in Algorithms | 5 | NUM | 21 |
| 10-I=AKES-232-m01 | Selected Topics in Embedded Systems | 5 | NUM | 24 |
| 10-l=AKHCl-232-m01 | Selected Topics in HCI | 5 | NUM | 26 |
| 10-l=AKII-232-m01 | Selected Topics in Computer Science | 5 | NUM | 28 |
| 10-I=AKIS-232-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 31 |
| 10-I=AKIT-232-m01 | Selected Topics in Internet Technologies | 5 | NUM | 33 |
| 10-I=AKITS-232-m01 | Selected Topics in IT Security | 5 | NUM | 36 |
| Computer Science (2019) | IMU Würzburg • generated 10-Apr-2025 • exam. reg. data recor | | Ulaara nag | 29/66 |



| | | , | | , |
|-------------------------|--|-----|----------|------|
| 10-I=AKLR-232-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 38 |
| 10-I=AKT-232-m01 | Selected Topics in Theory | 5 | NUM | 43 |
| 10-l=AGE-232-m01 | Selected Topics in Games Engineering | 5 | NUM | 19 |
| 10-l=AKSE-232-m01 | Selected Topics in Software Engineering | 5 | NUM | 41 |
| 10-l=LVS-232-m01 | Performance Evaluation of Distributed Systems | 5 | NUM | 46 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| 10-I=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-232-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 52 |
| 10-l=SEM3-232-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 56 |
| 10-l=SEM4-232-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 59 |
| 10-l=SSS-232-m01 | Security of Software Systems | 5 | NUM | 62 |
| 10-l=ST-232-m01 | Discrete Event Simulation | 5 | NUM | 65 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Winter Term 2024 | | l . | L | |
| 10-l=3D-232-m01 | 3D Point Cloud Processing | 5 | NUM | 14 |
| 10-l=AG-232-m01 | Computational Geometry | 5 | NUM | 17 |
| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 44 |
| 10-l=AKA-232-m01 | Selected Topics in Algorithms | 5 | NUM | 21 |
| 10-l=AKES-232-m01 | Selected Topics in Embedded Systems | 5 | NUM | 24 |
| 10-l=AKHCl-232-m01 | Selected Topics in HCI | 5 | NUM | 26 |
| 10-l=AKII-232-m01 | Selected Topics in Computer Science | 5 | NUM | 28 |
| 10-l=AKIS-232-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 31 |
| 10-l=AKIT-232-m01 | Selected Topics in Internet Technologies | 5 | NUM | 33 |
| 10-l=AKITS-232-m01 | Selected Topics in IT Security | 5 | NUM | 36 |
| 10-l=AKLR-232-m01 | Selected Topics in Aerospace Engineering | 5 | NUM | 38 |
| 10-l=AKNA-232-m01 | Selected Topics in Computer Science and Sustainability | 5 | NUM | 39 |
| 10-l=AKT-232-m01 | Selected Topics in Theory | 5 | NUM | 43 |
| 10-l=AKDS-232-m01 | Selected Topics in Data Science | 5 | NUM | 22 |
| 10-l=AGE-232-m01 | Selected Topics in Games Engineering | 5 | NUM | 19 |
| 10-l=AKSE-232-m01 | Selected Topics in Software Engineering | 5 | NUM | 41 |
| 10-LURI=AMS-232-m01 | Autonomous Mobile Systems | 10 | NUM | 66 |
| 10-l=LVS-232-m01 | Performance Evaluation of Distributed Systems | 5 | NUM | 46 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| | Performance Engineering and Benchmarking of Computer Sy- | | | 1 - |
| 10-I=PEB-182-m01 | stems | 5 | NUM | 49 |
| 10-l=PRAK-232-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 52 |
| 10-l=SEM3-232-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 56 |
| 10-l=SEM4-232-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 59 |
| 10-l=SSS-232-m01 | Security of Software Systems | 5 | NUM | 62 |
| 10-l=ST-232-m01 | Discrete Event Simulation | 5 | NUM | 65 |
| 10-l=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |
| Summer Term 2025 | 1 | 1 | <u> </u> | 1 22 |
| 10-l=3D-232-m01 | 3D Point Cloud Processing | 5 | NUM | 14 |
| 10-l=AA-152-m01 | Advanced Automation | 8 | NUM | 15 |
| 10-l=AG-232-m01 | Computational Geometry | 5 | NUM | 17 |
| Computer Science (2010) | IMILWiirzhurg a generated to Annager a gyam reg, data recer | | ļ | -/ |



| 10-l=APA-161-m01 | Approximation Algorithms | 5 | NUM | 4.4 |
|--------------------|--|----|------|-----|
| | | | NUM | 44 |
| 10-l=AKA-232-m01 | Selected Topics in Algorithms | 5 | | 21 |
| 10-l=AKES-232-m01 | Selected Topics in Embedded Systems | 5 | NUM | 24 |
| 10-l=AKHCl-232-m01 | Selected Topics in HCI | 5 | NUM | 26 |
| 10-l=AKII-232-m01 | Selected Topics in Computer Science | 5 | NUM | 28 |
| 10-l=AKIS-232-m01 | Selected Topics in Intelligent Systems | 5 | NUM | 31 |
| 10-l=AKIT-232-m01 | Selected Topics in Internet Technologies | 5 | NUM | 33 |
| 10-l=AKITS-232-m01 | IO-I=AKITS-232-m01 Selected Topics in IT Security | | NUM | 36 |
| 10-l=AKLR-232-m01 | o-I=AKLR-232-mo1 Selected Topics in Aerospace Engineering | | NUM | 38 |
| 10-l=AKT-232-m01 | o-l=AKT-232-mo1 Selected Topics in Theory | | NUM | 43 |
| 10-l=AGE-232-m01 | o-I=AGE-232-mo1 Selected Topics in Games Engineering | | NUM | 19 |
| 10-l=AKSE-232-m01 | Selected Topics in Software Engineering | 5 | NUM | 41 |
| 10-l=LVS-232-m01 | Performance Evaluation of Distributed Systems | 5 | NUM | 46 |
| 10-l=NLP-212-m01 | Machine Learning for Natural Language Processing | 5 | NUM | 48 |
| 10-I=PEB-182-m01 | Performance Engineering and Benchmarking of Computer Systems | 5 | NUM | 49 |
| 10-I=PRAK-232-m01 | Practical Course - Current Topics in Computer Science | 10 | B/NB | 52 |
| 10-l=SEM3-232-m01 | Seminar 1 - Current Topics in Computer Science | 5 | NUM | 56 |
| 10-l=SEM4-232-m01 | Seminar 2 - Current Topics in Computer Science | 5 | NUM | 59 |
| 10-l=SSS-232-m01 | Security of Software Systems | 5 | NUM | 62 |
| 10-l=ST-232-m01 | Discrete Event Simulation | 5 | NUM | 65 |
| 10-I=SAR-161-m01 | Software Architecture | 5 | NUM | 53 |



| Modul | e title | | | | Abbreviation | | |
|--------------------------------------|--|-------------------|---------------------|---------------------|-------------------------------|--|--|
| 3D Point Cloud Processing | | | | | 10-l=3D-161-m01 | | |
| Module coordinator Module offered by | | | | | | | |
| holder | holder of the Chair of Computer Science XVII | | | Institute of Compu | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. o | compl. of module(s) | | | |
| 5 numerical grade | | | | | | | |
| Duration Module level | | Other prerequisit | Other prerequisites | | | | |
| 1 semester graduate | | | | | | | |
| Conte | ntc | | . | | | | |

Contents

Laser scanning, Kinect and camera models, basic data structures (lists, arrays, oc-trees), calculating normals, kd trees, registration, features, segmentation, tracking, applications for airborne mapping, applications to mobile mapping.

Intended learning outcomes

Students understand the fundamental principles of all aspects of 3D point cloud processing and are able to communicate with engineers / surveyors / CV people / etc. Students are able to solve problems of modern sensor data processing and have experienced that real application scenarios are challenging in terms of computational requirements, in terms of memory requirements and in terms of implementation issues.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Separate written examination for Master's students.

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IS,LR,HCI,GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title Abbreviation | | | | Abbreviation | | | |
|---------------------------|--|---------------|---------------------|-------------------|-----------------|--|--|
| 3D Point Cloud Processing | | | | _ | 10-l=3D-212-m01 | | |
| Module coordinator | | | | Module offered by | | | |
| holder | er of the Chair of Computer Science XVII Institute of Computer Science | | | ter Science | | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duration Module level | | | Other prerequisite | S | | | |
| 1 semester graduate | | | | | | | |
| Conter | ıts | | , | | | | |

Laser scanning, Kinect and camera models, basic data structures (lists, arrays, oc-trees), calculating normals, kd trees, registration, features, segmentation, tracking, applications for airborne mapping, applications to mobile mapping.

Intended learning outcomes

Students understand the fundamental principles of all aspects of 3D point cloud processing and are able to communicate with engineers / surveyors / CV people / etc. Students are able to solve problems of modern sensor data processing and have experienced that real application scenarios are challenging in terms of computational requirements, in terms of memory requirements and in terms of implementation issues.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

Separate written examination for Master's students

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): KI,L-R,HCI,GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | | Abbreviation |
|--------------------------------------|---------|----------------------|---------------------|---------------------|-----------------|
| 3D Point Cloud Processing | | | | | 10-l=3D-232-m01 |
| Module coordinator Module offered by | | | | | |
| holder | of the | Chair of Computer So | cience XVII | Institute of Comput | ter Science |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level | | Other prerequisite | Other prerequisites | | |
| 1 semester graduate | | | | | |
| Conter | nts | | <u>.</u> | | |

Laser scanning, Kinect and camera models, basic data structures (lists, arrays, oc-trees), calculating normals, kd trees, registration, features, segmentation, tracking, applications for airborne mapping, applications to mobile mapping.

Intended learning outcomes

Students understand the fundamental principles of all aspects of 3D point cloud processing and are able to communicate with engineers / surveyors / CV people / etc. Students are able to solve problems of modern sensor data processing and have experienced that real application scenarios are challenging in terms of computational requirements, in terms of memory requirements and in terms of implementation issues.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): KI,L-R,HCI,GE

Workload

150 h

Teaching cycle

Teaching cycle: if announced

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title Abbreviation | | | | | |
|---------------------------|----------------|----------------------|---|-------------------|--|
| Advanced Automation | | | | | 10-l=AA-152-m01 |
| Module | coord | linator | | Module of | ered by |
| holder | of the | Chair of Computer S | cience VII | Institute of | Computer Science |
| ECTS | Meth | od of grading | Only after succ | . compl. of modu | ıle(s) |
| 8 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequis | sites | |
| 1 seme | ster | graduate | | | |
| Conten | ts | | | | |
| | | • | | | control engineering, for example from ssion and trajectory planning. |
| Intende | ed lear | ning outcomes | | | |
| | | have an advanced k | _ | topics in autom | ation systems. They are able to imple- |
| Course | s (type | e, number of weekly | contact hours, langua | ge — if other tha | n German) |
| V (4) + | Ü (2) | | · | | |
| | | | pe, language — if othoule ule can be chosen to | | examination offered — if not every seme |
| written | exami | nation (approx. 60 t | o 120 minutes) | | |

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,LR,GE

Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | | Abbreviation | |
|------------------------|---|---------------|---------------------|-------------------------------|-----------------|--|
| Computational Geometry | | | | | 10-l=AG-161-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | holder of the Chair of Computer Science I | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | Duration Module level | | Other prerequisite | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | | |
| Contents | | | | | | |

Contents

In many areas of computer science -- for example robotics, computer graphics, virtual reality and geographic information systems -- it is necessary to store, analyse, create or manipulate spatial data. This class is about the algorithmic aspects of these tasks: We will acquire techniques that are needed to plan and analyse geometric algorithms and data structures. Every technique will be illustrated with a problem in the practical areas listed above.

Intended learning outcomes

The students are able to decide which algorithms or data structures are suitable for the solution of a given geometric problem. The students are able to analyse new problems and to come up with their own efficient solutions based on the concepts and techniques acquired in the lecture.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,HCI,GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|---------------------|---|---------------|---------------------|-------------------------------|-----------------|--|
| Compu | ıtationa | al Geometry | | | 10-l=AG-232-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | holder of the Chair of Computer Science I | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisite | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conten | Contents | | | | | |

In many areas of computer science -- for example robotics, computer graphics, virtual reality and geographic information systems -- it is necessary to store, analyse, create or manipulate spatial data. This class is about the algorithmic aspects of these tasks: We will acquire techniques that are needed to plan and analyse geometric algorithms and data structures. Every technique will be illustrated with a problem in the practical areas listed abo-

Intended learning outcomes

The students are able to decide which algorithms or data structures are suitable for the solution of a given geometric problem. The students are able to analyse new problems and to come up with their own efficient solutions based on the concepts and techniques acquired in the lecture.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, HCI, GE, IN

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | Abbreviation | | | |
|--|---------|---------------|----------------------|-------------------------------|------------------|--|
| Selected Topics of Games Engineering | | | | | 10-l=AGE-191-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder of the Chair of Computer Science IX | | | ce IX | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Contents | | | | | | |
| Selected chapters of Games Engineering. | | | | | | |

Intended learning outcomes

The students understand the basic approach of games engineering. They are able to understand the solutions of complex problems in this area and apply them to similar questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): GE.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title Abbreviation | | | | | | | |
|--|---------|--|---|------------------------|-----------------------------------|--|--|
| Selecte | ed Topi | ics in Games Enginee | ering | | 10-l=AGE-232-m01 | | |
| Module | e coord | linator | | Module offered by | <i>I</i> | | |
| holder | of the | Chair of Computer So | ience IX | Institute of Comp | uter Science | | |
| ECTS | Meth | od of grading | Only after succ. o | ompl. of module(s) | | | |
| 5 | nume | erical grade | | | | | |
| Duratio | on | Module level | Other prerequisit | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| Selecte | ed chap | oters of Games Engin | eering. | | | | |
| Intende | ed lear | ning outcomes | | | | | |
| | | | approach of games en apply them to similar | | ble to understand the solutions o | | |
| Course | s (type | , number of weekly o | ontact hours, language | e — if other than Germ | nan) | | |
| V (2) + | Ü (2) | | | | | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) | | | | | | | |
| | ect wo | mination (approx. 60 rk (report (approx. 20 | | ion (30 to 45 minutes) |) and subsequent discussion on | | |

- the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): GE.

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | | | | | Abbreviation | | |
|--|---|--|---|-----------------------|--|--|--|
| Selecte | ed Topi | cs in Algorithms | | | 10-l=AKA-161-m01 | | |
| Module | e coord | linator | | Module offered by | | | |
| holder | of the | Chair of Computer Scienc | e l | Institute of Comput | ter Science | | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | | | | | |
| Selecte | ed topi | cs in algorithmics. | | | | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | understand the basic appomplex problems in this | | | They are able to understand the | | |
| Course | s (type | , number of weekly conta | ict hours, language – | - if other than Germa | an) | | |
| V (2) + | Ü (2) | | | | | | |
| | | sessment (type, scope, la ion on whether module c | | | ation offered — if not every seme- | | |
| If anno examir prox. 1 | unced nation o 5 minu age of a | of one candidate each (ap tes per candidate). assessment: German and | inning of the course, oprox. 20 minutes) or | | ntion may be replaced by an oral n in groups of 2 candidates (ap- | | |
| Allocat | ion of | places | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT | | | | | | | |
| Worklo | Workload | | | | | | |
| 150 h | 150 h | | | | | | |
| Teachi | Teaching cycle | | | | | | |
| | | | | | | | |

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|--|-----------------|-----------------------|---|----------------------|------------------------------------|--|
| Selected Topics in Algorithms | | | | | 10-I=AKA-232-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| holder | of the | Chair of Computer Sci | ence I | Institute of Compu | ter Science | |
| ECTS | Meth | od of grading | Only after succ. co | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisites | 5 | | |
| 1 seme | ester | graduate | | | | |
| Conte | nts | | | | | |
| Select | ed topio | cs in algorithmics. | | | | |
| Intend | ed lear | ning outcomes | | | | |
| | | | approach of algorithmionis area and apply them | | They are able to understand the s. | |
| Course | es (type | , number of weekly co | ntact hours, language - | – if other than Germ | an) | |
| V (2) + | Ü (2) | | | | | |
| | | | e, language — if other the can be chosen to ear | | ation offered — if not every seme- | |
| a) written examination (approx. 60 to 120 minutes) or b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus | | | | | | |
| Allocation of places | | | | | | |
| | | | | | | |

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): ΑT

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|---------------------------------|---|---------------|----------------------|-------------------------------|-------------------|--|
| Selected Topics in Data Science | | | | - | 10-I=AKDS-232-m01 | |
| Module coordinator | | | | Module offered by | | |
| Dean o | Dean of Studies Informatik (Computer Science) | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. cor | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisites | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | | |
| Conten | Contents | | | | | |

Selected topics in data science

Intended learning outcomes

Students understand the basic approach of data science. They are able to understand how to solve complex problems in this field and transfer them to related issues.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): KI

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | Abbreviation | | | | |
|--|---|---|-----------------------|-----------------------|-------------------------------------|--|--|--|
| Select | ed Topi | cs in Embedded Systems | 3 | | 10-I=AKES-161-m01 | | | |
| Modul | e coord | inator | | Module offered by | | | | |
| Dean c | of Studi | es Informatik (Computer | Science) | Institute of Comput | ter Science | | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | | | |
| 5 | nume | rical grade | | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | | |
| 1 seme | ester | graduate | | | | | | |
| Conter | nts | | | | | | | |
| Select | ed topio | cs in embedded systems. | | | | | | |
| Intend | ed lear | ning outcomes | | | | | | |
| | | possess specialised kno oplex problems in this are | | | . They are able to understand sons. | | | |
| Course | es (type | , number of weekly conta | act hours, language – | - if other than Germa | an) | | | |
| V (2) + | Ü (2) | | _ | | | | | |
| | | sessment (type, scope, la ion on whether module c | | | ntion offered — if not every seme- | | | |
| If anno examin prox. 1 Langua | written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus | | | | | | | |

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): ES.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | | |
|---|---------|---------------|------------------|---------------------|-------------------|--|--|
| Selected Topics in Embedded Systems | | | | | 10-l=AKES-232-m01 | | |
| Modul | e coord | linator | | Module offered by | | | |
| Dean of Studies Informatik (Computer Science) | | | er Science) | Institute of Comp | uter Science | | |
| ECTS | Meth | od of grading | Only after succ. | compl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisi | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | | |
| Contents | | | | | | | |
| Selected topics in embedded systems. | | | | | | | |
| Intended learning outcomes | | | | | | | |

The students possess specialised knowledge in the area of embedded systems. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): ES.

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|---|-----------------|-----------------------|---|----------------------|--|--|
| Selected Topics in HCI | | | | | 10-I=AKHCI-182-m01 | |
| Modu | le coord | inator | | Module offered by | | |
| holde | r of the (| Chair of Computer Sci | ence IX | Institute of Compu | ter Science | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | ion | Module level | Other prerequisites | 1 | | |
| 1 sem | ester | graduate | | | | |
| Conte | nts | | | | | |
| Select | ed topic | cs in HCI. | | | | |
| Intend | led lear | ning outcomes | | | | |
| | | | approach of human-con his area and to transfer t | | hey are able to understand the stions. | |
| Cours | es (type | , number of weekly co | ontact hours, language – | - if other than Germ | an) | |
| V (2) + | - Ü/S (2) |) | | | | |
| | | | | | ation offered — if not every seme- | |
| ster, information on whether module can be chosen to earn a bonus) written examination (60 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus | | | | | | |
| Allocation of places | | | | | | |
| | | | | | | |
| Additi | onal inf | ormation | | | | |
| Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): HCI. | | | | | | |

Focuses available for students of the Master's programme informatik (Computer Science, 120 ECIS credits): HCI.

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | Abbreviation | | |
|---------------------------|---------|---------------------|-----------------|----------------------------------|-------------------|--|
| Selected Topics in HCI | | | | | 10-l=AKHCl-232-mo | |
| Modul | e coord | inator | | Module offere | d by | |
| holder | of the | Chair of Computer S | cience IX | IX Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ | compl. of module(| s) | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequi | sites | | |
| 1 seme | ster | graduate | | | | |
| Contents | | | | | | |
| Selected topics in HCI. | | | | | | |
| mton dad lagueira automas | | | | | | |

Intended learning outcomes

The students understand the basic approach of human-computer interaction. They are able to understand the solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}/S(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): HCI.

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | | | | | Abbreviation | | | |
|-------------------------|---|--|---|-----------------------|---|--|--|--|
| Selecte | ed Topi | cs in Computer Science | | | 10-l=AKII-182-m01 | | | |
| Module | e coord | inator | | Module offered by | | | | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Comput | er Science | | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | | | |
| 5 | nume | rical grade | | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | | |
| 1 seme | ster | graduate | | | | | | |
| Conten | ts | | | | | | | |
| Selecte | ed topio | cs in computer science. | | | | | | |
| Intend | ed lear | ning outcomes | | | | | | |
| | | are able to understand thed questions. | e solutions to compl | ex problems in comp | outer science and to transfer | | | |
| Course | s (type | , number of weekly conta | ıct hours, language – | - if other than Germa | ın) | | | |
| V (2) + | Ü/S (2) |) | | | | | | |
| | | sessment (type, scope, la ion on whether module c | | | tion offered — if not every seme- | | | |
| If anno examir prox. 19 | unced nation o 5 minu nge of a | of one candidate each (ap tes per candidate). Issessment: German and | inning of the course, oprox. 20 minutes) or | | tion may be replaced by an oral in groups of 2 candidates (ap- | | | |
| Allocat | ion of | places | | | | | | |
| | | | | | | | | |
| Additio | nal inf | ormation | | | | | | |
| | | | | | | | | |
| Worklo | Workload | | | | | | | |
| 150 h | 150 h | | | | | | | |
| Teaching cycle | | | | | | | | |
| | | | | | | | | |
| Referre | ed to in | LPO I (examination regu | lations for teaching- | degree programmes) | | | | |
| | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |



| Module title Abbreviation | | | | | | | |
|--|---|-----------------------|------------------------------------|--|--|--|--|
| Selected Topics in Computer Science | | | 10-l=AKII-232-m01 | | | | |
| Module coordinator | | Module offered by | | | | | |
| Dean of Studies Informatik (Computer | Science) | Institute of Comput | ter Science | | | | |
| ECTS Method of grading | Only after succ. con | npl. of module(s) | | | | | |
| 5 numerical grade | | | | | | | |
| Duration Module level | Other prerequisites | | | | | | |
| 1 semester graduate | | | | | | | |
| Contents | | | | | | | |
| Selected topics in computer science. | | | | | | | |
| Intended learning outcomes | | | | | | | |
| The students are able to understand them to related questions. | ne solutions to compl | ex problems in comp | outer science and to transfer | | | | |
| Courses (type, number of weekly conta | act hours, language – | - if other than Germa | an) | | | | |
| V (2) + Ü/S (2) | _ | | | | | | |
| Method of assessment (type, scope, laster, information on whether module c | | | ntion offered — if not every seme- | | | | |
| a) written examination (approx. 60 to 120 minutes) or b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus | | | | | | | |
| Allocation of places | | | | | | | |
| | | | | | | | |
| Additional information | Additional information | | | | | | |
| | | | | | | | |
| Workload | | | | | | | |
| 150 h | | | | | | | |
| Teaching cycle | | | | | | | |
| Teaching cycle: if announced | | | | | | | |
| | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |



| Modul | | cs in Intelligent Systems | | Abbreviation | | | | |
|---|---|---|----------------------|-----------------------|--------------------------------------|--|--|--|
| Select | eu ropi | cs in intettigent Systems | | | 10-l=AKIS-161-m01 | | | |
| Modul | e coord | inator | | Module offered by | | | | |
| holder | of the (| Chair of Computer Scienc | e VI | Institute of Comput | er Science | | | |
| ECTS | | od of grading | Only after succ. con | ıpl. of module(s) | | | | |
| 5 | nume | rical grade | | | | | | |
| Durati | on | Module level | Other prerequisites | | | | | |
| 1 seme | ester | graduate | | | | | | |
| Conte | nts | | | | | | | |
| Select | ed topio | s in intelligent systems. | | | | | | |
| Intend | ed lear | ning outcomes | | | | | | |
| | | | • | | s. They are able to understand so- | | | |
| | _ | plex problems in this are , number of weekly conta | | • | | | | |
| V (2) + | | , number of weekly conta | ct nours, tanguage | - II Other than Germa | ui) | | | |
| | <u>`</u> | recement (tune scene la | nguaga if other the | an Corman ovamina | tion offered — if not every seme- | | | |
| | | on on whether module ca | | | tion offered — if flot every selfie- | | | |
| If anno examin prox. 1 Langua | written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus | | | | | | | |
| Alloca | tion of p | olaces | | | | | | |
| | | | | | | | | |
| Additional information | | | | | | | | |
| Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IS. | | | | | | | | |
| Workload | | | | | | | | |
| 150 h | 150 h | | | | | | | |
| Teachi | ing cycl | e | | | | | | |
| | | | | | | | | |

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | Module title Abbreviation | | | | | | |
|--|--|---|------------------------|-----------------------|---------------------------------------|--|--|
| Selected Topics in Intelligent Systems | | | | | 10-l=AKIS-212-m01 | | |
| Module coordinator Module offer | | | | | 10 1 7 1110 222 11102 | | |
| | | | | Module offered by | | | |
| | | Chair of Computer Scier | Í | Institute of Comput | ter Science | | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | | rical grade | | | | | |
| Durati | | Module level | Other prerequisites | | | | |
| 1 seme | ester | graduate | | | | | |
| Conte | nts | | | | | | |
| Select | ed topio | s in intelligent systems | i . | | | | |
| Intend | led lear | ning outcomes | | | | | |
| | | possess an advanced k uplex problems in this a | • | | s. They are able to understand soons. | | |
| Course | es (type | , number of weekly con | tact hours, language – | - if other than Germa | an) | | |
| V (2) + | · Ü (2) | | | | | | |
| | | sessment (type, scope, on on whether module | | | ation offered — if not every seme- | | |
| written examination (approx. 60 to 120 minutes) If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus | | | | | | | |
| Allocation of places | | | | | | | |
| | | | | | | | |
| Additional information | | | | | | | |
| Focuse | Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): KI | | | | | | |
| Workl | oad | | | | | | |

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | Abbreviation | | | | |
|--|--|--------------|---------------------|-------------------------------|-------------------|--|--|
| Selected Topics in Intelligent Systems | | | | | 10-l=AKIS-232-m01 | | |
| Module coordinator Module offered by | | | | | | | |
| holder of the Chair of Computer Science VI | | | ice VI | Institute of Computer Science | | | |
| ECTS | Method of grading Only after succ. con | | npl. of module(s) | | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ester | graduate | | | | | |
| Contents | | | | | | | |
| Selected topics in intelligent systems. | | | | | | | |
| Intend | Intended learning outcomes | | | | | | |

The students possess an advanced knowledge in the area of intelligent systems. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): KI

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | Module title Abbreviation | | | | | |
|--|---|-------------|-------------------|-------------------------------|-------------------|--|
| Selected Topics in Internet Technologies | | | | | 10-I=AKIT-161-m01 | |
| Module coordinator Mo | | | | Module offered by | Module offered by | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | ECTS Method of grading Only after succ. con | | mpl. of module(s) | | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level Other prerequ | | | s | | |
| 1 semester graduate | | | | | | |
| Conten | Contents | | | | | |

Selected topics in computer communication, for example design aspects of future internet structures: setup and control structures of the internet, multicast protocols, protocols for multimedia communication, optical networks, control mechanisms for redundant and real-time communication networks, p2p networks, ad-hoc networks, or -- new concepts and technologies in mobile communication: digital modulation, signal propagation, channel coding, modern transmission technologies (adaptive modulation and coding, hybrid ARQ, OFDM, MI-MO), mac layer, mobileIP, routing in ad-hoc networks, vertical handover, UMTS IP multimedia subsystem, or -- planning and management methods in telecommunication networks: planning methods (forward engineering, reverse engineering), network management paradigms (central and decentral), framework for network management (IETF traffic engineering, ITU-T TMN, OSI management), planning and management methods (IP management mechanisms, network design, measurement, acquisition and evaluation of traffic and performance data, visualisation, result handling, simulation and analysis of networks), management tools, outlook and perspectives, or -- other current topics.

Intended learning outcomes

The students have a knowledge of advanced and current topics in the management and design of modern wired and wireless communication systems.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT.

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|--|---|--------------------|-------------------|-------------------------------|-------------------|--|
| Selected Topics in Internet Technologies | | | | | 10-l=AKIT-232-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | ECTS Method of grading Only after succ. con | | mpl. of module(s) | | | |
| 5 numerical grade | | | | | | |
| Duration Module level Other pro | | Other prerequisite | s | | | |
| 1 semester graduate | | | | | | |
| Conter | Contents | | | | | |

Selected topics in computer communication, for example design aspects of future internet structures: setup and control structures of the internet, multicast protocols, protocols for multimedia communication, optical networks, control mechanisms for redundant and real-time communication networks, p2p networks, ad-hoc networks, or -- new concepts and technologies in mobile communication: digital modulation, signal propagation, channel coding, modern transmission technologies (adaptive modulation and coding, hybrid ARQ, OFDM, MI-MO), mac layer, mobileIP, routing in ad-hoc networks, vertical handover, UMTS IP multimedia subsystem, or -- planning and management methods in telecommunication networks: planning methods (forward engineering, reverse engineering), network management paradigms (central and decentral), framework for network management (IETF traffic engineering, ITU-T TMN, OSI management), planning and management methods (IP management mechanisms, network design, measurement, acquisition and evaluation of traffic and performance data, visualisation, result handling, simulation and analysis of networks), management tools, outlook and perspectives, or -- other current topics.

Intended learning outcomes

The students have a knowledge of advanced and current topics in the management and design of modern wired and wireless communication systems.

Courses (type, number of weekly contact hours, language — if other than German)

V(2) + Ü(2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT.

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | le title | Abbreviation | | | | |
|--|--------------------------------|---------------------------------------|--------------------|-------------------------------|--------------------|--|
| Selected Topics in IT Security | | | | | 10-l=AKITS-172-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder of the Chair of Computer Science II | | | cience II | Institute of Computer Science | | |
| ECTS | Meth | Method of grading Only after succ. co | | ompl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisite | es | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |
| Select | Selected tonics in IT security | | | | | |

Selected topics in IT security.

Intended learning outcomes

The students possess an advanced knowledge in the area of IT security. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, IS, LR, HCI, ES.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|--|------|---------------|---------------------|-------------------------------|--------------------|--|
| Selected Topics in IT Security | | | | | 10-I=AKITS-212-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder of the Chair of Computer Science II | | | cience II | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | ompl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Other prerequisites | | | Other prerequisite | <u></u> | | |
| 1 semester graduate | | | | | | |
| Conter | nte | • | • | | | |

Selected topics in IT security.

Intended learning outcomes

The students possess an advanced knowledge in the area of IT security. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, KI, LR, HCI, ES, SEC

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|--------------------------------|--|---------------------|----------------------|-------------------------------|--------------------|--|
| Selected Topics in IT Security | | | | • | 10-I=AKITS-232-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | holder of the Chair of Computer Science II | | | Institute of Computer Science | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | 5 numerical grade | | | | | |
| Duration Module level Other | | Other prerequisites | | | | |
| 1 semester graduate | | | | | | |

Contents

Selected topics in IT security.

Intended learning outcomes

The students possess an advanced knowledge in the area of IT security. They are able to understand solutions to complex problems in this area and to transfer them to related questions.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, KI, LR, HCI, ES, SEC

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|--|--------------------------|---------------------|---------------------|-------------------------------|-------------------|--|
| Selected Topics in Aerospace Engineering | | | | | 10-I=AKLR-161-m01 | |
| Modul | e coord | linator | | Module offered by | | |
| holder | of the | Chair of Computer S | cience VII | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | erical grade | | | | |
| Durati | Duration Module level Ot | | Other prerequisite | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | | |
| Contor | Contents | | | | | |

Selected topics in aerospace engineering, for example: satellite communication, rocket science, propulsion systems, sensors and actuators for orientation control, perturbation of orbits, interplanetary orbits, rendezvous and docking, design of space ships, design of planetary bases, life support systems, special aspects of operations, payloads, optical systems, RADAR, earth monitoring, thermo management, structure of space ships, special areas of navigation, space environment, environment simulation, verification and test of space faring systems, space astronomy and planet missions, space medicine and biology, material science, quality management, space law, aeroflight topics, avionics for airplanes, air traffic control, areal navigation, pilot interfaces, air traffic control, air traffic management.

Intended learning outcomes

The students possess an advanced knowledge about the respective topic of the selected area and are able to consider these foundations in their future plans of air or spaceborne systems.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Separate written examination for Master's students.

Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): LR.

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | Abbreviation | | | |
|--|---|---------------|---------------------|-------------------------------|-------------------|--|--|
| Selected Topics in Aerospace Engineering | | | | - | 10-l=AKLR-232-m01 | | |
| Module coordinator | | | | Module offered by | | | |
| holder | holder of the Chair of Computer Science VII | | | Institute of Computer Science | | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | Other prerequisites | | | |
| 1 seme | 1 semester graduate | | | | | | |
| Conten | Contents | | | | | | |

Selected topics in aerospace engineering, for example: satellite communication, rocket science, propulsion systems, sensors and actuators for orientation control, perturbation of orbits, interplanetary orbits, rendezvous and docking, design of space ships, design of planetary bases, life support systems, special aspects of operations, payloads, optical systems, RADAR, earth monitoring, thermo management, structure of space ships, special areas of navigation, space environment, environment simulation, verification and test of space faring systems, space astronomy and planet missions, space medicine and biology, material science, quality management, space law, aeroflight topics, avionics for airplanes, air traffic control, areal navigation, pilot interfaces, air traffic control, air traffic management.

Intended learning outcomes

The students possess an advanced knowledge about the respective topic of the selected area and are able to consider these foundations in their future plans of air or spaceborne systems.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

- a) written examination (approx. 60 to 120 minutes) or
- b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): LR.

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | Module title Abbreviation | | | | | | |
|--|---------------------------|---|---|-------------------------|--------------------------------|--|--|
| Selecte | d Topi | cs in Computer Scier | nce and Sustainability | | 10-I=AKNA-232-m01 | | |
| Module | coord | linator | | Module offered by | | | |
| Dean o | f Studi | es Informatik (Compu | uter Science) | Institute of Comput | er Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisite | S | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | | | | | |
| Selecte | d topi | cs in computer scienc | ce and sustainability | | | | |
| Intende | ed lear | ning outcomes | | | | | |
| | | | approach of topics in s his area and to apply th | | hey are able to understand the | | |
| Course | s (type | , number of weekly c | ontact hours, language | — if other than Germa | n) | | |
| V (2) + Module | | nt in: German and/or | English | | | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus) | | | | | | | |
| | | mination (approx. 60 k (report (approx. 20 | | on (30 to 45 minutes) a | and subsequent discussion on | | |

- the topic) or
- c) oral examination of one candidate each (approx. 20 minutes) or
- d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate)

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IN

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title Abbreviation | | | | | |
|---------------------------|---|---|---|----------------------|--|
| | Selected Topics in Software Engineering | | | | 10-I=AKSE-161-m01 |
| Module | Module coordinator M | | | Module offered by | |
| | | Chair of Computer Science | | Institute of Comput | tor Scianca |
| ECTS | | od of grading | Only after succ. con | | ter Science |
| 5 | | rical grade | | ipt. or inodute(3) | |
| Duratio | | Module level | Other prerequisites | | |
| 1 seme | | graduate | | | |
| Conter | its | | | | |
| Selecte | ed topi | cs in software engineerin | g. | | |
| | | ning outcomes | | | |
| The stu | ıdents | possess an advanced kn | owledge about select | ed aspects of softwa | are engineering. |
| | | , number of weekly conta | | - | |
| V (2) + | | <u>, </u> | , 0 0 | | , |
| | | sessment (type, scope, la | | | ation offered — if not every seme- |
| If anno examir prox. 1 | unced nation of minu age of a | of one candidate each (a tes per candidate). assessment: German and | ginning of the course, pprox. 20 minutes) or | | ation may be replaced by an oral n in groups of 2 candidates (ap- |
| Allocat | ion of | places | | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| Focuse | s avail | able for students of the <i>I</i> | Master's programme l | nformatik (Compute | r Science, 120 ECTS credits): SE. |
| Worklo | ad | | | | |
| 150 h | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referre | ed to in | LPO I (examination regu | ulations for teaching- | degree programmes) | |
| | | | | - , , , | |



| Module title Abbreviation | | | | | | |
|---------------------------------------|---|--|---|-----------------------|--------------------------------------|--|
| Selecte | Selected Topics in Software Engineering | | | | 10-l=AKSE-232-m01 | |
| Module | e coord | inator | | Module offered by | | |
| holder | of the | Chair of Computer Scienc | e II | Institute of Comput | ter Science | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | its | | | | | |
| Selecte | ed topi | cs in software engineerin | g. | | | |
| Intend | ed lear | ning outcomes | | | | |
| The stu | idents | possess an advanced kn | owledge about select | ed aspects of softwa | are engineering. | |
| Course | s (type | , number of weekly conta | act hours, language – | - if other than Germa | an) | |
| V (2) + | Ü (2) | | | | | |
| | | sessment (type, scope, la ion on whether module c | - | | ation offered — if not every seme- | |
| b) projethe top c) oral d) oral | ect wor oic) or examir examir age of a | nation of one candidate e nation in groups of up to ussessment: German and | es) with presentation ach (approx. 20 minu 3 candidates (approx | ites) or | and subsequent discussion on didate) | |
| Allocat | ion of | places | | | | |
| | _ | | - | | | |
| Additio | nal inf | ormation | | | | |
| Focuse | Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE. | | | | | |
| Workload | | | | | | |
| 150 h | 150 h | | | | | |
| _ | Teaching cycle | | | | | |
| | <u> </u> | | | | | |
| | | | | | | |

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title Abbreviation | | | | | Abbreviation |
|---|---|--|--|-----------------------|--|
| Selected Topics in Theory 10-I=AKT-161-m01 | | | | | 10-I=AKT-161-m01 |
| Modul | e coord | linator | | Module offered by | |
| holder | of the | Chair of Computer Science | te I | Institute of Compu | ter Science |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | on | Module level | Other prerequisites | i | |
| 1 seme | ster | graduate | | | |
| Conter | ıts | | | | |
| Selecte | ed topi | cs in theory. | | | |
| Intend | ed lear | ning outcomes | , | | |
| | | understand the basic ap omplex problems in this | | | hey are able to understand the |
| Course | s (type | , number of weekly conta | act hours, language – | - if other than Germa | an) |
| V (2) + | | • | · · · · · · · · · · · · · · · · · · · | | · |
| | | sessment (type, scope, la | - | | ation offered — if not every seme- |
| If anno examir prox. 1 | ounced nation of 5 minu age of a | of one candidate each (a _l tes per candidate). assessment: German and | ginning of the course, oprox. 20 minutes) or | | ation may be replaced by an oral n in groups of 2 candidates (ap- |
| Allocat | tion of | places | | | |
| | | | | | |
| Additio | onal inf | ormation | | | |
| Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT | | | | | |
| Workload | | | | | |
| 150 h | | | | | |
| Teachi | ng cycl | le | | | |
| | | | | | |

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | Module title Abbreviation | | | | | | |
|--|---------------------------|-----------------------|----------------------|---------------------|--|--|--|
| Selecte | ed Topi | ics in Theory | | | 10-I=AKT-232-m01 | | |
| Module | e coord | linator | | Module offe | ered by | | |
| holder | of the | Chair of Computer So | cience I | Institute of | Computer Science | | |
| ECTS | Meth | od of grading | Only after suc | cc. compl. of modul | le(s) | | |
| 5 | nume | erical grade | | | | | |
| Duratio | on | Module level | Other prerequ | uisites | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ıts | | | | | | |
| Selecte | ed topi | cs in theory. | | | | | |
| Intend | ed lear | ning outcomes | , | | | | |
| | | understand the basion | | • | ience. They are able to understand the lestions. | | |
| Course | s (type | e, number of weekly o | contact hours, langi | uage — if other tha | n German) | | |
| V (2) + | Ü (2) | | | | | | |
| | | | | | examination offered — if not every seme- | | |
| ster, information on whether module can be chosen to earn a bonus) a) written examination (approx. 60 to 120 minutes) or b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus | | | | | | | |
| Allocat | tion of | places | | | | | |
| | | | | | | | |

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | Abbreviation | | |
|--------------------|--------------------------|--------------------------|----------------------|-------------------------------|------------------|--|
| Approx | Approximation Algorithms | | | | 10-l=APA-161-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | of the | Chair of Computer Scienc | e I | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. con | ıpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisites | | | |
| 1 seme | 1 semester graduate | | | | | |
| C 4 | C | | | | | |

The task of finding the optimal solution for a given problem is omnipresent in computer science. Unfortunately, there are many problems without an efficient algorithm for an optimal solution. As a result, in practice, methods are used which do not always give the optimal solution but always give good solutions. This lecture will discuss drafting and analysing techniques for algorithms which have a proven approximation quality. With the help of practical optimisation problems, the lecture will introduce students to important drafting techniques such as greedy, local search, scaling as well as methods based on linear programming.

Intended learning outcomes

The students are able to analyse easy approximation methods in terms of their quality. They understand fundamental drafting techniques such as greedy, local search and scaling as well as methods based on linear programming and are able to apply these to new problems.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,IT,GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | Abbreviation | | |
|---|---|---------------|----------------------|-------------------------------|------------------|--|
| Performance Evaluation of Distributed Systems | | | | | 10-I=LVS-161-m01 | |
| Module | e coord | inator | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 8 | nume | rical grade | | | | |
| Duratio | Duration Module level Other | | Other prerequisites | 3 | | |
| 1 seme | 1 semester graduate | | | | | |
| Conten | Contents | | | | | |

Traffic theoretic models, fundamental concepts of theory of probability, transformation techniques, stochastic processes, methods for performance analysis of technical systems, queue-/traffic theory, analysis of Markov, non-Markov and time critical systems, matrix analytical method, practical examples for performance analysis of computer systems and networks: throughput and goodput analysis and other characteristics.

Intended learning outcomes

The students possess the methodic knowledge and the practical skills necessary to model technical systems by means of the theory of probability and mathematical statistics.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(4) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,IT,GE

Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|--------------------|---|-----------------------|---------------------|-------------------------------|------------------|--|
| Perfor | mance | Evaluation of Distrib | outed Systems | | 10-I=LVS-232-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisite | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | | |
| Conter | Contents | | | | | |

The performance evaluation of distributed systems is illustrated and practically performed on a contemporary example, e.g., the Internet of Things (IoT). The following topics will be conveyed:

Traffic theoretic models, fundamental concepts of theory of probability, transformation techniques, stochastic processes, methods for performance analysis of technical systems, queuing and traffic theory, discrete-time and continuous Markov chains, analysis of Markov and non-Markov systems, practical examples for performance evaluation of computer systems and networks: service quality and other characteristics.

Intended learning outcomes

The students possess the methodic knowledge and the practical skills necessary to model technical systems by means of the theory of probability and mathematical statistics.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,IT,GE,IN

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | Abbreviation | | |
|---------------------|---|--------------------------|----------------------|-------------------------------|------------------|--|
| Machir | ne Lear | ning for Natural Languag | e Processing | | 10-I=NLP-182-m01 | |
| Module | e coord | inator | | Module offered by | | |
| Dean o | Dean of Studies Informatik (Computer Science) | | | Institute of Computer Science | | |
| ECTS | Metho | od of grading | Only after succ. com | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisites | | | |
| 1 semester graduate | | | | | | |
| Conten | Contents | | | | | |

The lecture conveys advanced knowledge about methods in computational text processing. To this end, it presents state of the art models and techniques in the area of machine learning, as well as their technical background, and their respective applications in Natural Language Processing. As one important building block of almost all modern NLP-models, different techniques for learning representations of words, so called Word Embeddings, are presented. Starting from this we cover, among others, models from the area of Deep Learning, like CNNs, RNNs and Sequence-to-Sequence architectures. The theoretical foundations of these models, like their training with Backpropagation, are also covered in depth. For all models presented in the lecture, we show their application to problems like sentiment analysis, text generation and machine translation in practice.

Intended learning outcomes

The participants have solid knowledge on problems and methods in the area of computational text processing and are able to identify and apply suitable methods for a specific task.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, IS, HCI.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | ' | | | Abbreviation | |
|---------|---|----------------------|---------------------|-------------------------------|-------------------|--|
| Machii | ne Lear | ning for Natural Lar | nguage Processing | | 10-I=NLP-212-m01 | |
| Modul | e coord | linator | | Module offered by | Module offered by | |
| holder | holder of the Chair of Computer Science X | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level O | | Other prerequisite | es | | |
| 1 seme | 1 semester graduate | | | | | |
| Conter | Contents | | | | | |

The lecture conveys advanced knowledge about methods in computational text processing. To this end, it presents state of the art models and techniques in the area of machine learning, as well as their technical background, and their respective applications in Natural Language Processing. As one important building block of almost all modern NLP-models, different techniques for learning representations of words, so called Word Embeddings, are presented. Starting from this we cover, among others, models from the area of Deep Learning, like CNNs, RNNs and Sequence-to-Sequence architectures. The theoretical foundations of these models, like their training with Backpropagation, are also covered in depth. For all models presented in the lecture, we show their application to problems like sentiment analysis, text generation and machine translation in practice.

Intended learning outcomes

The participants have solid knowledge on problems and methods in the area of computational text processing and are able to identify and apply suitable methods for a specific task.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,KI,HCI

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|---|--------------------|---|------------------------|-----------------------|--|--|
| Perforr | nance | Engineering and Benchn | narking of Computer S | Systems | 10-I=PEB-182-m01 | |
| Module | Module coordinator | | | Module offered by | | |
| holder | of the | Chair of Computer Scien | ce II | Institute of Comput | ter Science | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | i | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| | | | | | ormance measurement technice prediction, case studies. | |
| Intend | ed lear | ning outcomes | | | | |
| ment to | echniq | | nce analysis, data ana | alysis with R, benchr | performance metrics, measure- mark approaches, modelling with its. | |
| Course | s (type | , number of weekly cont | act hours, language – | - if other than Germa | an) | |
| V (2) + Module | ` ' | t in: English | | | | |
| | | sessment (type, scope, l | | | ation offered — if not every seme- | |
| | age of a | nation (approx. 90 to 120 Issessment: English bonus | o minutes) | | | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Workload | | | | | | |
| 150 h | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |



| Module | Module title Abbreviation | | | | |
|--|---|--|-----------------------|-----------------------|------------------------------------|
| Practic | Practical course - Current Topics in Computer Science | | | | 10-I=PRAK-161-m01 |
| Module | e coord | inator | | Module offered by | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Comput | ter Science |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | (not) | successfully completed | | | |
| Duratio | n | Module level | Other prerequisites | i . | |
| 1 seme | ster | graduate | | | |
| Conten | ts | | | | |
| Comple | etion of | f a practical task. | | | |
| Intende | ed lear | ning outcomes | | | |
| The pra | actical | allows participants to wo | rk on a problem in co | mputer science in te | eams. |
| Course | s (type | , number of weekly conta | ct hours, language – | - if other than Germa | an) |
| P (6) | | | | | |
| | | sessment (type, scope, la ion on whether module c | | | ation offered — if not every seme- |
| | | to 15 pages) ssessment: German and | or English | | |
| Allocat | | | | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| | | able for students of the N LR, HCI, GE | laster's programme I | nformatik (Compute | r Science, 120 ECTS credits): AT, |
| Workload | | | | | |
| 300 h | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referre | d to in | LPO I (examination regu | lations for teaching- | degree programmes) | |
| , and Junior 1 and | | | | | |



| Module | Module title Abbreviation | | | | | |
|---|---|--|------------------------|----------------------|------------------------------------|--|
| Practical Course - Current Topics in Computer Science | | | | | 10-I=PRAK-212-m01 | |
| Module | e coord | inator | | Module offered by | | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Comput | ter Science | |
| ECTS | | od of grading | Only after succ. con | pl. of module(s) | | |
| 10 | (not) | successfully completed | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| Comple | etion o | f a practical task. | | | | |
| Intend | ed lear | ning outcomes | | | | |
| The pra | actical | allows participants to wo | rk on a problem in co | mputer science in te | eams. | |
| Course | s (type | , number of weekly conta | ict hours, language – | if other than Germa | an) | |
| The co | urse is d of as | it in: German and English offered in parallel in both sessment (type, scope, la ion on whether module c | German and English | an German, examina | ation offered — if not every seme- | |
| | | to 15 pages) ssessment: German and | or English/ | · | | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, KI, ES, LR, HCI, GE | | | | | |
| Workload | | | | | | |
| 300 h | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referre | ed to in | LPO I (examination regu | lations for teaching-o | degree programmes) | | |
| | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |



| Modul | e title | | | Abbreviation | |
|-----------------------------------|--------------------|--|-----------------------|----------------------|------------------------------------|
| Practio | cal Cou | rse - Current Topics in Co | | 10-I=PRAK-232-m01 | |
| Module coordinator Module offered | | | | Module offered by | |
| Dean c | of Studi | es Informatik (Computer | Science) | Institute of Comput | ter Science |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | (not) | successfully completed | | | |
| Duratio | on | Module level | Other prerequisites | i e | |
| 1 seme | ester | graduate | | | |
| Conter | nts | | | | |
| Compl | etion o | f a practical task. | | | |
| Intend | ed lear | ning outcomes | | | |
| The pra | actical | allows participants to wo | rk on a problem in co | mputer science in te | eams. |
| | | , number of weekly conta | | • | |
| ster, in term p | nformat aper (5 | sessment (type, scope, la ion on whether module c to 15 pages) assessment: German and | an be chosen to earn | | ation offered — if not every seme- |
| | tion of | | | | |
| | | - | | | |
| Additio | onal inf | formation | | | |
| | | able for students of the N LR, HCI, GE, SEC, IN | laster's programme I | nformatik (Compute | r Science, 120 ECTS credits): AT, |
| Worklo | oad | | | | |
| 300 h | | | | | |
| Teachi | ing cyc | le | | | |
| | | | | | |
| Referre | ed to in | LPO I (examination regu | lations for teaching- | degree programmes) | |
| | | | | | |



| Module title | | | | | Abbreviation | |
|-----------------------|----------|------------------------|---------------------|-------------------------------|------------------|--|
| Software Architecture | | | | - | 10-I=SAR-161-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | of the | Chair of Computer Scie | ence II | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | Other prerequisites | | |
| 1 seme | ester | graduate | | | | |
| Conter | Contents | | | | | |

Introduction to software architecture, architectural styles and patterns, software metrics, evaluation of architectural styles, software components, interface models and design guidelines, design-by-contract, component-based software engineering, service-oriented architectures, microservice architectures, scalability of databases, cloud-native and serverless computing, continuous integration, continuous delivery, continuous deployment, model-driven architecture

Intended learning outcomes

The students possess a fundamental and applicable knowledge about advanced topics in software engineering with a focus on modern software architectures and fundamental approaches to model-driven software enginee-

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE,IT,ES

Workload

150 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|---|---------|-------------------------|----------------------|-------------------------------|-------------------|--|
| Seminar 1 - Current Topics in Computer Science | | | | | 10-l=SEM3-161-m01 | |
| Module | e coord | linator | | Module offered by | | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on . | Module level | Other prerequisites | | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |
| Independent review of a current topic in computer science based on literature and, where applicable, software | | | | | | |

with written and oral presentation. Intended learning outcomes

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language — if other than German)

S (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on a topic from the field of computer science

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, IS, ES, LR, HCI´, GE.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | Abbreviation | | | | |
|---------------------|---|-----------------------|----------------------|-------------------------------|-------------------|--|--|
| Semina | ar 1 - Cı | urrent Topics in Comp | uter Science | - | 10-I=SEM3-212-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| Dean o | Dean of Studies Informatik (Computer Science) | | | Institute of Computer Science | | | |
| ECTS | Meth | od of grading | Only after succ. cor | mpl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | Other prerequisites | | | |
| 1 semester graduate | | | | | | | |
| Conten | Contents | | | | | | |

Independent review of a current topic in computer science based on literature and, where applicable, software with written and oral presentation.

Intended learning outcomes

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language — if other than German)

S (2)

Module taught in: German and English

The course is offered in parallel in both German and English.

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on a topic from the field of computer science

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, KI, ES, LR, HCI, GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | Module title | | | | Abbreviation | |
|--|---|---------------|--------------------|---------------------|-------------------------------|--|
| Seminar 1 - Current Topics in Computer Science | | | | | 10-l=SEM3-232-m01 | |
| Modul | e coord | linator | | Module offered by | Module offered by | |
| Dean o | Dean of Studies Informatik (Computer Science) | | | Institute of Compu | Institute of Computer Science | |
| ECTS | Meth | od of grading | Only after succ. o | compl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Other prered | | | Other prerequisi | tes | | |
| 1 seme | 1 semester graduate | | | | | |
| Contor | Contents | | | | | |

Independent review of a current topic in computer science based on literature and, where applicable, software with written and oral presentation.

Intended learning outcomes

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language - if other than German)

S (2)

Module taught in: German and English

The course is offered in parallel in both German and English.

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on a topic from the field of computer science

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, KI, ES, LR, HCI, GE, SEC, IN

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation |
|---|---------|-------------------------|--------------------------------------|--------------------|-------------------|
| Seminar 2 - Current Topics in Computer Science | | | | - | 10-l=SEM4-161-m01 |
| Module | e coord | linator | | Module offered by | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Compu | ter Science |
| ECTS | Meth | od of grading | Only after succ. compl. of module(s) | | |
| 5 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | 3 | |
| 1 seme | ster | graduate | | | |
| Conten | its | | , | | |
| Independent review of a current topic in computer science based on literature and, where applicable, software with written and oral presentation. | | | | | |
| Intended learning outcomes | | | | | |

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language — if other than German)

S (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on the topic of the seminar

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, IS, ES, LR, HCI, GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|---|---------|-------------------------|----------------------|-------------------------------|-------------------|--|
| Seminar 2 - Current Topics in Computer Science | | | | | 10-l=SEM4-212-m01 | |
| Module | e coord | inator | | Module offered by | | |
| Dean o | f Studi | es Informatik (Computer | Science) | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |
| Independent review of a current topic in computer science based on literature and, where applicable, software | | | | | | |

with written and oral presentation. Intended learning outcomes

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language - if other than German)

S (2)

Module taught in: German and English

The course is offered in parallel in both German and English.

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on the topic of the seminar

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, KI, ES, LR, HCI, GE

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | Abbreviation | | |
|---------------------|---|----------------------|-----------------|-------------------------------|--|--|
| Semin | ar 2 - C | urrent Topics in Cor | nputer Science | 10-I=SEM4-232-m01 | | |
| Modul | e coord | inator | | Module offered by | | |
| Dean c | Dean of Studies Informatik (Computer Science) | | | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ | compl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequis | sites | | |
| 1 semester graduate | | | | | | |
| Conter | Contents | | | | | |

Independent review of a current topic in computer science based on literature and, where applicable, software with written and oral presentation.

Intended learning outcomes

The students are able to independently review a current topic in computer science, to summarise the main aspects in written form and to orally present these in an appropriate way.

Courses (type, number of weekly contact hours, language — if other than German)

S (2)

Module taught in: German and English

The course is offered in parallel in both German and English.

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion on the topic of the seminar

Language of assessment: German and/or English

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, SE, IT, KI, ES, LR, HCI, GE, SEC, IN

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | Abbreviation | | |
|---------------------------------|----------|------------------------|----------------------|-------------------------------|------------------|--|
| Securit | ty of So | oftware Systems | | - | 10-I=SSS-172-m01 | |
| Module | e coord | linator | | Module offered by | | |
| holder | of the | Chair of Computer Scie | ence II | Institute of Computer Science | | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Other pre | | | Other prerequisites | ; | | |
| 1 semester graduate | | | | | | |
| Conton | Contents | | | | | |

The lecture provides an overview of common software vulnerabilities, state-of-the-art attack techniques on modern computer systems, as well as the measures implemented to protect against these attacks. In the course, the following topics are discussed:

- x86-64 instruction set architecture and assembly language
- Runtime attacks (code injection, code reuse, defenses)
- Web security
- · Blockchains and smart contracts
- Side-channel attacks
- Hardware security

Intended learning outcomes

Students gain a deep understanding of software security, from hardware and low-level attacks to modern concepts such as blockchains. The lecture prepares for research in the area of security and privacy, while the exercises allow students to gain hands-on experience with attacks and analysis of systems from an attacker's perspective.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, IS, LR, HCI, ES.

Basic programming knowledge in C is required.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

| Computer Science (2019) |
|-------------------------|
|-------------------------|



| Module | e title | , | | | Abbreviation | |
|-----------------------------|--|----------------|---------------------|-------------------------------|------------------|--|
| Securit | ty of So | ftware Systems | | - | 10-l=SSS-212-m01 | |
| Module | e coord | inator | | Module offered by | | |
| holder | holder of the Chair of Computer Science II | | | Institute of Computer Science | | |
| ECTS | CTS Method of grading Only after succ. co | | | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Other | | | Other prerequisites | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conton | Contents | | | | | |

The lecture provides an overview of common software vulnerabilities, state-of-the-art attack techniques on modern computer systems, as well as the measures implemented to protect against these attacks. In the course, the following topics are discussed:

- x86-64 instruction set architecture and assembly language
- Runtime attacks (code injection, code reuse, defenses)
- Web security
- · Blockchains and smart contracts
- Side-channel attacks
- Hardware security

Intended learning outcomes

Students gain a deep understanding of software security, from hardware and low-level attacks to modern concepts such as blockchains. The lecture prepares for research in the area of security and privacy, while the exercises allow students to gain hands-on experience with attacks and analysis of systems from an attacker's perspective.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, KI, LR, HCI, ES, SEC

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module | e title | | | | Abbreviation | |
|----------------------------|--|----------------|---------------------|-------------------------------|------------------|--|
| Securit | ty of So | ftware Systems | | | 10-l=SSS-232-m01 | |
| Module | e coord | inator | | Module offered by | | |
| holder | holder of the Chair of Computer Science II | | | Institute of Computer Science | | |
| ECTS | CTS Method of grading Only after succ. co | | | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Othe | | | Other prerequisites | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conten | Contents | | | | | |

The lecture provides an overview of common software vulnerabilities, state-of-the-art attack techniques on modern computer systems, as well as the measures implemented to protect against these attacks. In the course, the following topics are discussed:

- x86-64 instruction set architecture and assembly language
- Runtime attacks (code injection, code reuse, defenses)
- Web security
- · Blockchains and smart contracts
- Side-channel attacks
- Hardware security

Intended learning outcomes

Students gain a deep understanding of software security, from hardware and low-level attacks to modern concepts such as blockchains. The lecture prepares for research in the area of security and privacy, while the exercises allow students to gain hands-on experience with attacks and analysis of systems from an attacker's perspective.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Module taught in: English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE,KI,LR, HCI, ES, SEC,IN

Workload

150 h

Teaching cycle

Teaching cycle: every year, summer semester

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | | Abbreviation | |
|-----------------------|---|--------------|--------------------|-------------------------------|-----------------|--|
| Discre | te Even | t Simulation | | | 10-l=ST-161-m01 | |
| Modul | e coord | linator | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | TS Method of grading Only after succ. co | | | mpl. of module(s) | | |
| 8 | numerical grade | | | | | |
| Duration Module level | | | Other prerequisite | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conto | Contents | | | | | |

Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects.

Intended learning outcomes

The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(4) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes).

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,IS,ES,GE

Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|---------------------------|---|--------------------------------------|---------------------|-------------------------------|-----------------|--|
| Discrete Event Simulation | | | | - | 10-l=ST-212-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | Meth | ethod of grading Only after succ. co | | mpl. of module(s) | | |
| 8 | nume | rical grade | | | | |
| Duration Module level | | Other prerequisite | Other prerequisites | | | |
| 1 semester graduate | | graduate | | | | |
| Conter | Contents | | | | | |

Introduction to simulation techniques, statistical groundwork, creation of random numbers and random variables, random sample theory and estimation techniques, statistical analysis of simulation values, inspection of measured data, planning and evaluation of simulation experiments, special random processes, possibilities and limits of model creation and simulation, advanced concepts and techniques, practical execution of simulation projects.

Intended learning outcomes

The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simu-

Courses (type, number of weekly contact hours, language — if other than German)

 $V(4) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English creditable for bonus

Allocation of places

Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,KI,ES,GE

Workload

240 h

Teaching cycle

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Modul | e title | | | | Abbreviation | |
|-------------------------|---|--------------|---------------------|-------------------------------|-----------------|--|
| Discre | te Even | t Simulation | | = | 10-l=ST-232-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| holder | holder of the Chair of Computer Science III | | | Institute of Computer Science | | |
| ECTS | TS Method of grading Only after succ. co | | | mpl. of module(s) | | |
| 5 | numerical grade | | | | | |
| Duration Module level O | | | Other prerequisites | other prerequisites | | |
| 1 semester graduate | | | | | | |
| Contor | Contonto | | | | | |

The simulation of communication systems is illustrated and practically performed on contemporary examples, e.g., popular Internet services or the Internet of Things (IoT). The following topics will be conveyed: Introduction to simulation techniques, discrete-event simulation and process-oriented simulation, generating random numbers and random variables, statistical analysis of simulation results, evaluation of measured data, designing and evaluating simulation experiments, special random processes, possibilities and limitations of modelling and simulation, advanced concepts and techniques, practical execution of simulation projects.

Intended learning outcomes

The students possess the methodic knowledge and the practical skills necessary for the stochastic simulation of (technical) systems, the evaluation of results and the correct assessment of the possibilities and limits of simulation methods.

Courses (type, number of weekly contact hours, language — if other than German)

 $V(2) + \ddot{U}(2)$

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT,KI,ES,GE,IN

Workload

150 h

Teaching cycle

Teaching cycle: every year, summer semester

Referred to in LPO I (examination regulations for teaching-degree programmes)



| Module title | | | | | Abbreviation | |
|--|---------------------------------------|----------------|--------------------|-------------------------------|---------------------|--|
| Auton | omous | Mobile Systems | | | 10-LURI=AMS-232-m01 | |
| Modul | e coord | linator | | Module offered by | | |
| holder of the Chair of Computer Science XVII | | | Science XVII | Institute of Computer Science | | |
| ECTS | Method of grading Only after succ. co | | | ompl. of module(s) | | |
| 10 | nume | erical grade | | | | |
| Duration Module level | | | Other prerequisite | Other prerequisites | | |
| 1 semester | | graduate | | | | |
| Conto | Contents | | | | | |

(1) What are mobile robots? (2) Sensors (3) Sensor data processing (4) Locomotion and kinematics (5) Localization (6) Localization in maps (7) Mapping and SLAM (8) Navigation (9) Sensor data interpretation (10) Robot control architectures

Intended learning outcomes

Students know Bayesian concepts for sensor data processing for a mobile system and are able to apply the concepts to mobile robots. Derived concepts like Kalman filter, Particle filter, POMDPs, etc. are understood. They have learned the steps to build and program mobile systems.

 $\textbf{Courses} \ (\textbf{type}, \textbf{number of weekly contact hours, language} - \textbf{if other than German})$

 $V(4) + \ddot{U}(2)$

Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 60 to 120 minutes)

If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).

Language of assessment: German and/or English

creditable for bonus

Allocation of places

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Additional information

Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IT, KI, ES, LR, GE

Workload

300 h

Teaching cycle

Teaching cycle: every year, summer semester

Referred to in LPO I (examination regulations for teaching-degree programmes)