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M.Sc. Digital Engineering

Sommer 2021

Stand 16.09.2021

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M.Sc. Digital Engineering

Faculty Welcome for Master's Students Digital Engineering

Tuesday, 6th April 2021, 12.00 a.m., room 015, Bauhausstraße 11 and additionally via BigBlueButton:

https://meeting.uni-weimar.de/b/chr-che-lqi-0xq

Project fair

Tuesday, 6th April 2021, 5 p.m. via Moodle:

https://moodle.uni-weimar.de/course/view.php?id=26486

4256402 Oberseminar Rendering, Visualisierung und Virtual Reality

B. Fröhlich Veranst. SWS: 2
Seminar
Do, wöch., 10:30 - 12:00, Online bzw. nach Vereinbarung, ab 08.04.2021

Beschreibung

Vorträge zu aktuellen Dissertationen und Veröffentlichungen sowie laufenden Master- und Bachelorarbeiten zu den Themen Rendering, Visualisierung und Interaktion werden im Rahmen des Seminars präsentiert und diskutiert.

Bemerkung

Für diese Veranstaltung werden keine ECTS-Punkte vergeben.

Introduction to Machine Learning (repeat exam)

B. Stein, M. Völske
Prüfung
Do, Einzel, 16:00 - 19:00, Bauhausstraße 11 - Seminarraum 015, written exam, 29.07.2021 - 29.07.2021

Introduction to Mechanics (repeat exam)

T. Rabczuk, D. Torres Achicanoy
Prüfung
Mo, Einzel, 13:30 - 15:30, written exam location: 110, M15, 02.08.2021 - 02.08.2021

Introduction to Python Programming

A. Jakoby
Tutorium

Block, Course Instructor: Rosemary Adejoh, 13.09.2021 - 24.09.2021

Object-oriented Modeling and Programming in Engineering (repeat exam)

M. Artus, C. Koch
Prüfung
Mi, Einzel, von 13:30, online, 28.07.2021 - 28.07.2021

Fundamentals (F)

Advanced Numerical Mathematics

4556105 Advanced Numerical Mathematics

K. Gürlebeck, D. Legatiuk Veranst. SWS: 4
Vorlesung
Mo, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2, Lecture (hybrid), ab 12.04.2021
Mo, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Exercise (hybrid), ab 12.04.2021
Mo, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Seminarraum 210, written exam, 09.08.2021 - 09.08.2021

Beschreibung

Höhere Numerik

Effiziente Lösung linearer und nichtlinearer Gleichungssysteme;
• Diskretisierungsmethoden für verschiedene Typen partieller Differentialgleichungen
• Projektionsverfahren, Stabilität, Konvergenz und Konditionszahl
• Direkte Löser für schwach besetzte Systemmatrizen
• Fixpunktsatz, iterative Löser, Gesamtschrittverfahren, Einzelschrittverfahren, Gradientenverfahren, Relaxationsverfahren, Multiskalenmethoden und Überblick über andere Zugänge
• Eigenwertprobleme, iterative Löser
• Gebietszerlegungsverfahren

engl. Beschreibung/ Kurzkommentar

Advanced Numerical Mathematics

Efficient solution of linear and non-linear systems of algebraic equations;
• Discretization methods for different types of partial differential equations
• Projection methods, stability and convergence, condition number
• Direct solvers for sparse systems
• Fixed-point theorem, iterative solvers: Total step method, single step method, gradient methods, relaxation methods, multiscale methods and a survey on other approaches
• Eigenvalue problems, iterative solvers
• Domain decomposition methods

Voraussetzungen

Courses in Linear Algebra, Analysis

Leistungsnachweis

Project

Algorithms and Datastructures

4555211 Algorithmen und Datenstrukturen

C. Wüthrich, F. Andreussi, Projektbörse Fak. KuG Veranst. SWS: 4
Vorlesung
Do, wöch., 11:00 - 12:30, Vorlesung / Lecture (online) https://moodle.uni-weimar.de/course/view.php?id=31390, ab 15.04.2021
Fr, wöch., 11:00 - 12:30, Übung / Exercise (online), ab 23.04.2021
Fr, wöch., 15:15 - 16:45, Übung / Exercise (online), ab 23.04.2021
Do, Einzel, 10:00 - 12:00, Prüfung / exam Falkenburg / Innensporthalle, 05.08.2021 - 05.08.2021

Beschreibung

Das Lernziel dieser Veranstaltung soll zum einen der generelle Umgang und die selbstständige Entwicklung, Analyse, und Optimierung von Algorithmen und Datenstrukturen sein. Zum anderen soll ein Überblick über gängige problemspezifische Verfahren und deren Anwendung in der Praxis vermittelt werden.

engl. Beschreibung/ Kurzkommentar

Algorithms and Data Structures

The lecture deals with the principle and the implementation of basic algorithms and data structures. The course teaches among all, the Strings, geometric problems, graphs, mathematical algorithms and NP-complete problems.

Leistungsnachweis

Beleg, Klausur

Applied Mathematics and Stochastics

Introduction to Mechanics

Nonlinear Continuum Mechanics

Object-oriented Modeling and Programming in Engineering

Software Engineering

417290000 Software Engineering (M.Sc.)

N. Ruckel Veranst. SWS: 3
Vorlesung
Mo, wöch., 15:15 - 16:45, Lecture (online)https://moodle.uni-weimar.de/course/view.php?id=31474, ab 12.04.2021
Fr, wöch., 15:15 - 16:45, Exercise (online), ab 16.04.2021
Mo, Einzel, 09:00 - 11:00, Steubenstraße 6, Haus F - Hörsaal K20, written exam, 02.08.2021 - 02.08.2021

engl. Beschreibung/ Kurzkommentar

Software Engineering (M.Sc.)

Developing software requires more than just programming skills. Answering conceptual questions is perhaps even more important than excellent knowledge of a programming language. This course introduces participants to the basics of structured software development. During the course of a larger development project, the presented techniques will be exercised in practice. Topics include all phases of the development process, such as requirements analysis, UML modelling, design patterns or agile development.

Voraussetzungen

programming skills

Leistungsnachweis

Exercise assignments + written exam

Statistics

301005 Statistics

R. Illge Veranst. SWS: 4

Integrierte Vorlesung

Di, wöch., 13:30 - 15:00, lab class (online, live), ab 06.04.2021
Do, wöch., 07:30 - 09:00, Lecture (online) Moodle: https://moodle.uni-weimar.de/enrol/index.php?id=30709, ab 08.04.2021
Do, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal B, written exam, 29.07.2021 - 29.07.2021

engl. Beschreibung/ Kurzkommentar

Statistics

Contents:
- Probability (Events, classical probability, axiomatic approach, conditional probability)
- Random variables (Discrete random variables, continuous random variables, limit theorems)
- Descriptive statistics (Graphical representation and frequency distributions, location and scattering parameters, bivariate and multivariate analysis: dependence and correlation, regression analysis)
- Inductive statistics
- Point and interval estimation
- Parameter testing
- Goodness-of-fit-tests
- Nonparametric tests
- Tests for independence and correlation

Voraussetzungen

B.Sc. in a related study field, Basic knowledge on random variables and the most important distributions

Leistungsnachweis

Written exam

Structural Dynamics

Structural Engineering Models

401007 Structural Engineering Models

C. Könke Veranst. SWS: 4

Integrierte Vorlesung

Mo, Einzel, 11:30 - 13:00, Marienstraße 13 C - Hörsaal A, written exam, 26.07.2021 - 26.07.2021
Di, wöch., 15:00 - 16:45, Marienstraße 13 C - Hörsaal D, Lecture (in person teaching/hybrid)
Do, wöch., 15:00 - 16:45, Marienstraße 13 C - Hörsaal C, Exercise (in person teaching/hybrid)

Beschreibung

Student will be able to build an abstract model for structural engineering problem and to assess its restriction and quality. The student will be able to perform dimen-sion reduction in structural engineering using concepts from structural mechanics. They will be capable of classify different types of civil engineering structures and to distinguish

different principal load transfer processes. The student can classify line-ar/nonlinear problems and time variant/ invariant problems in structural engineering.

Fundamental equations in structural mechanics for 1D, 2D and 3D structures, equi-librium equation, kinematic relation, constitute law, Method to establish the govern-ing differential equations, Differences between geometric / physical linear and non-linear problems, Classification of different types of structures: truss, beam, plate, shell problems

Voraussetzungen

basic course in structural mechanics

basic course in applied mathematics

Leistungsnachweis

written test

Requirements for exam registration: 2 home works accepted

Modelling (M)

4- und 5D-Building Information Modeling (BIM)

Advanced Building Information Modeling

303001 Advanced Building Information Modelling

C. Koch, M. Alabassy, J. Krischler Veranst. SWS: 4

Vorlesung

Do, wöch., 09:15 - 10:45, Lecture (online) Moodle: https://moodle.uni-weimar.de/course/view.php?id=31111, ab 08.04.2021
Mi, wöch., 09:15 - 10:45, Exercise (online), ab 14.04.2021
Fr, wöch., 07:30 - 09:00, Exercise (online) , ab 16.04.2021

engl. Beschreibung/ Kurzkommentar

Advanced Building Information Modelling

Content: Advanced geometric and parametric modelling, Interoperability and collaboration concepts (IFC, IDM, BEP), Advanced use cases (e.g. clash detection, as-built model-ing), BIM programming (incl. visual programming)

Target qualifications: This module introduces advanced concepts of Building Information Modelling (BIM) to provide students with advanced knowledge in order to understand, analyze and discuss scientific research approaches related to BIM. Within the frame of the mod-ule project (coursework) the students will choose a topic from a pre-defined list or come up with their own topic. Based on that they will do detailed research, imple-ment a representative concept in a software prototype and discuss findings and limi-tations. Also the students acquire skills of scientific working and presentation.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of Computer-Aided Design, BIM concepts, and object-oriented programming

Leistungsnachweis

written report, presentation

Advanced Modelling - Calculation

301013 Advanced modelling - calculation/CAE (L + E)

K. Gürlebeck, D. Legatiuk Veranst. SWS: 4
Vorlesung
Di, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

Beschreibung

Scientifically orientated education in mathematical modelling and computer science in view of a complex interdisciplinary and networked field of work and research, modelling and simulation.

Students will have experience in Computer Aided Engineering (CAE) by establishing a problem specific model on the basis of a mathematical formulation, an applicable solution technique, design of efficient data structures and software implementation.

Numerical and analytical solution of partial differential equations, series expansions, integral representations, finite difference methods, description of heat flow, diffusion, wave propagation and elastostatic problems.

The topics are discussed theoretically and then implemented.

Convergence, stability and error analysis of finite difference methods (FDM). Modelling of steady and unsteady heat conduction problems, wave propagation and vibrations and problems from linear thermo-elasticity in 2D and 3D. After considering the mathematical basis, the students will work on individual projects passing all levels of work (engineering model, mathematical model, numerical model, computer model, simulation, evaluation).

The solution methods will be implemented by help of MAPLE or MATLAB.

Bemerkung

This lecture replaces "Advanced Analysis". It is therefore not possible to receive credits for both courses.

Die Veranstaltung ersetzt "Advanced Analysis" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

Leistungsnachweis

1 Project report + Presentation

”Advanced Modelling – Calculation/CAE” (100%) / **SuSe**

Collaborative Data Management

Computer models for physical processes - from observation to simulation

Introduction to Optimization

451002+45 Introduction to Optimization / Optimization in Applications (L)

T. Lahmer Veranst. SWS: 3
Vorlesung
Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Hybrid
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Hybrid

Beschreibung

Introduction to Optimization (451002):

Definitions, Classification of Optimization Problems, Linear Problems, Simplex Method, Duality, Optimization on Graphs Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants

Optimization in Applications (451006):

This course treats topics concerned with the combination of optimization methods and (numerical) models. Typical problems, where such combinations arise, are Calibration of Models, Inverse Problems; (Robust) Structural Optimization (including Shape and Topologyoptimization); Design of Experiments

Bemerkung

This course can be combined with Stochastic Simulation Techniques and Structural Reliability (L) to form a 6 CP module named Stochastic Simulation and Optimization.

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Introduction to Optimization” / (50%) / **WiSe** + SuSe

1 written or oral exam (depending on the number of participants)

”Optimization in Applications” / (50%) / **SuSe** + WiSe

Macroscopic Transport Modelling

Modelling in the development process

Optimization in Applications

451002+45 Introduction to Optimization / Optimization in Applications (L)

T. Lahmer Veranst. SWS: 3

Vorlesung

Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Hybrid
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Hybrid

Beschreibung

Introduction to Optimization (451002):

Definitions, Classification of Optimization Problems, Linear Problems, Simplex Method, Duality, Optimization on Graphs Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants

Optimization in Applications (451006):

This course treats topics concerned with the combination of optimization methods and (numerical) models. Typical problems, where such combinations arise, are Calibration of Models, Inverse Problems; (Robust) Structural Optimization (including Shape and Topologyoptimization); Design of Experiments

Bemerkung

This course can be combined with Stochastic Simulation Techniques and Structural Reliability (L) to form a 6 CP module named Stochastic Simulation and Optimization.

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Introduction to Optimization” / (50%) / **WiSe** + SuSe

1 written or oral exam (depending on the number of participants)

”Optimization in Applications” / (50%) / **SuSe** + WiSe

Raumbezogene Informationssysteme/ Spatial information systems (GIS)

Simulation and Validation (SaV)

Design and Interpretation of Experiments / Signal Processing

Experimental Structural Dynamics

401009 Experimental structural dynamics and Structural monitoring (P)

V. Zabel Veranst. SWS: 4
Projekt
Di, wöch., 07:30 - 12:30, Marienstraße 7 B - Projektraum 301

Beschreibung

The students obtain deepened knowledge in structural dynamics, structural dynamic analysis, data processing, dynamic test equipment and its handling. They learn to analyse the dynamic behaviour of a structure utilizing both numerical and experimental state-of-the-art methods. Furthermore, the students have to develop strategies and concepts of investigation. The work in small groups enhances the social competence of the students.

Operational modal analysis, sensor types, sensor positioning, data analysis and assessment, assessment of structural changes, structural modelling, model updating

Bemerkung

14 students from NHRE only

Voraussetzungen

Structural dynamics

Leistungsnachweis

1 Project report + intermediate and final presentations

„ Experimental structural dynamics”

(100%) / **SuSe**

Extended Finite Elements and Mesh Free Methods

Finite Element Methods (FEM)

Fundamentals of structural health monitoring (SHM) and intelligent structural systems

Linear FEM

Modelling of Steel Structures and Numerical Simulation

205007 Modelling of steel structures and numerical simulation (L + E)

M. Kraus, S. Mämpel Veranst. SWS: 4

Vorlesung

1-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise
2-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Exercise
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise
Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal A, Lecture Hybrid
Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal B, Lecture Hybrid

Beschreibung

The students will be familiar with skills and expertise in the field of nonlinear structural analyses. Extensive knowledge of theoretical basics and modern modelling methods including numerical representations are the aim of the course. The students will acquire skills in handling advanced tools for the analysis and the design of structures.

Design of steel structures using finite element methods; basics of the design; modelling of structures and loads; nonlinear material behaviour, numerical analyses of steel-members and structures regarding geometric and physical nonlinearities; stability behaviour of members including flexural and lateral torsional buckling

Leistungsnachweis

1 Project report

”Modelling of steel structures and numerical simulation” (0%) / **SuSe**

1 written exam

”Modelling of steel structures and numerical simulation”/ 120 min (100%) / **SuSe** + WiSe

Nonlinear FEM

Process modelling and simulation in logistics and construction

Simulation Methods in Engineering

303002 Simulation Methods in Engineering

C. Koch, M. Artus Veranst. SWS: 4

Vorlesung

Fr, wöch., 09:15 - 10:45, Lecture (online) Moodle: https://moodle.uni-weimar.de/course/view.php?id=31066, ab 09.04.2021
Mo, wöch., 07:30 - 09:00, Exercise (online), ab 12.04.2021
Fr, wöch., 13:30 - 15:00, Exercise (online)

engl. Beschreibung/ Kurzkommentar

Simulation Methods in Engineering

Content:

- System analysis and modelling
- System dynamics
- Discrete event simulation
- Multi-agent simulation
- Input data and stochastic simulation

- Simulation based optimization
- Introduction to the software AnyLogic

Target qualifications:

This module provides students with comprehensive knowledge about computer based simulation concepts to address practical challenges in engineering. Modern simulation and optimization software is introduced within tutorials. The module project (coursework) offers an opportunity to students to work in groups on current problems in the context of civil and environmental engineering (e.g. production logistics, pedestrian simulation, pollutant dispersion). Using object-oriented simula-tion software the students will analyze, model and simulate different engineering systems. The programming is carried out using Java. Also the students acquire team working and presentation skills.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of programming

Leistungsnachweis

Short group report, group presentation, written exam

Stochastic Simulation Techniques and Structural Reliability

2451007 Stochastic Simulation Techniques and Structural Reliability (L)

T. Lahmer Veranst. SWS: 3

Integrierte Vorlesung

Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, Lecture Hybrid
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise

Beschreibung

Soils, rocks and materials like concrete are in the natural state among the most variable of all engineering materials. Engineers need to deal with this variability and make decisions in situations of little data, i.e. under high uncertainties. The course aims in providing the students with techniques state of the art in risk assessment (structural reliability) and stochastic simulation.
The course topics comprise
- (a very brief review) of probability theory
- discrete and continuous random processes and fields
- estimation of statistical parameters
- stochastic simulation techniques (Monte Carlo Samplings)
- reliability-based design
- sensitivity analysis
- structural safety
- Risk assessment and stochastic modelling in practice

Bemerkung

The lecture consists of weekly lectures by Prof. Tom Lahmer (Bauhaus University Weimar) throughout the semester and an intensive practical training (Blockkurs) on applications by Dr. Thomas Most (DYNARDO, Weimar)
Please indicate your interest in the course via an E-Mail to Prof. Tom Lahmer (tom.lahmer@uni-weimar.de) by briefly citing the title of the lecture and providing your name until **April 2nd, 2021** as this will make the organization of rooms, course material, etc. much easier.

This course can be combined with Introduction to Optimization / Optimization in Applications (L) to form a 6 CP module named Stochastic Simulation and Optimization.

Voraussetzungen

Basic knowledge in probability theory

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Stochastic Simulation Techniques and Structural Reliability” / (50%) / **SuSe** + WiSe

Structural Health Monitoring

Visualization and Data Science (VaDS)

Image Analysis and Object Recognition

4336010 Image Analysis and Object Recognition

V. Rodehorst, M. Kaisheva Veranst. SWS: 3

Vorlesung

Di, wöch., 09:15 - 10:45, Lecture (online,recorded sessions) Moodle: https://moodle.uni-weimar.de/course/view.php?id=30890
(Registration will be open from March 29, 2021 onwards.), ab 06.04.2021
Do, unger. Wo, 11:00 - 12:30, Lab (online), ab 15.04.2021
Di, Einzel, 09:00 - 11:00, written exam Location: Falkenburg, 27.07.2021 - 27.07.2021
Mo, Einzel, 09:00 - 12:00, Bauhausstraße 11 - Seminarraum 015, repeat exam (written exam), 06.09.2021 - 06.09.2021

Beschreibung

Bildanalyse und Objekterkennung

Die Vorlesung gibt eine Einführung in die Grundlagen der Mustererkennung und Bildanalyse. Behandelt werden unter anderem die Bildverbesserung, lokale und morphologische Operatoren, Kantenerkennung, Bilddarstellung im Frequenzraum, Fourier-Transformation, Hough-Transformation, Segmentierung, Skelettierung, Objektklassifizierung und maschinelles Lernen zur visuellen Objekterkennung.

engl. Beschreibung/ Kurzkommentar

Image analysis and object recognition

The lecture gives an introduction to the basic concepts of pattern recognition and image analysis. It covers topics as image enhancement, local and morphological operators, edge detection, image representation in frequency domain, Fourier transform, Hough transform, segmentation, thinning, object categorization and machine learning for visual object recognition.

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur (sowie des Final Projects für das Erreichen der 6 ECTS)

Introduction to Machine Learning

Mobile Information Systems

Photogrammetric Computer Vision

Real-time Rendering

Search Algorithms

Search-Based Software Engineering

Software Product Line Engineering

Visualization

4555262 Visualisierung

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 3
Vorlesung
Do, wöch., 13:30 - 15:00, Vorlesung/Lecture - taught online (live&recorded)- Moodle: https://moodle.uni-weimar.de/course/view.php?id=31089 , ab 08.04.2021
Mo, wöch., 17:00 - 18:30, Übung /Lab class (Master) - taught online (live sessions) - , ab 12.04.2021
Di, wöch., 11:00 - 12:30, Übung (Bachelor) - taught online (live sessions)- , ab 13.04.2021
Mo, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, schriftl. Prüfung / written exam, 27.09.2021 - 27.09.2021

Beschreibung

Im ersten Teil der Veranstaltung werden die wichtigsten Verfahren und Techniken aus dem Bereich der Informationsvisualisierung für folgende Datentypen vorgestellt: multi-dimensionale und hierarchische Daten, Graphen, Zeitreihen und mengenbasierte Daten. Der zweite Teil beschäftigt sich mit verschiedenen Ansätzen und Algorithmen zur Visualisierung volumetrischer und vektorieller Simulations- und Messdaten. Die Veranstaltung wird englischsprachig angeboten.

In den Übungen werden eine Auswahl der in den Vorlesungen vorgestellten Visualisierungsansätze umgesetzt, getestet und evaluiert. Ein separates Abschlussprojekt wird angeboten und mit zusätzlich 1,5 ETCS angerechnet.

Bemerkung

Bitte beachten Sie:
um 6ECTS Punkte zu erhalten, ist zusätzlich der Kurs "Visualization - Final Project" verpflichtend zu belegen.

Voraussetzungen

Programmierkenntnisse sowie gute Kenntnisse von Algorithmen und Datenstrukturen sind erforderlich, z.B. nachgewiesen durch den erfolgreichen Abschluss der entsprechenden Lehrveranstaltungen des Bachelor-Studiengangs Medieninformatik. In den Laborveranstaltungen werden JavaScript- und grundlegende GLSL-Programmierung eingesetzt. Grundkenntnisse der Computergrafik sind hilfreich, z.B. erworben durch die Vorlesung Computergrafik im Bachelor-Studiengang Medieninformatik.

Leistungsnachweis

Vorlesungsbegleitende Übungen, mündliche oder schriftliche Prüfung.

Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

420160006 Visualization - Final Project

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 1
Independent Study

Beschreibung

Im Abschlussprojekt der Vorlesung „Visualisierung” sollen die Teilnehmer die erlangten theoretischen und praktischen Fertigkeiten auf den Entwurf, die Implementierung und die Präsentation eines eigenständigen kleinen Forschungsprojektes anwenden. Dazu soll ein Problem ausgewählt, eine Lösung entwickelt, eine effiziente Implementierung realisiert und die Ergebnisse abschließend in einem Vortrag präsentiert werden.

Dies ist eine wertvolle Gelegenheit, an einem selbst gewählten Thema im Bereich der Visualisierung zu arbeiten.

Voraussetzungen

Erfolgreiche Teilnahme an der Vorlesung „Visualization”

Leistungsnachweis

Dokumentation, Abschlusspräsentation

Elective Modules

4555262 Visualisierung

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 3

Vorlesung

Do, wöch., 13:30 - 15:00, Vorlesung/Lecture - taught online (live&recorded)- Moodle: https://moodle.uni-weimar.de/course/view.php?id=31089 , ab 08.04.2021
Mo, wöch., 17:00 - 18:30, Übung /Lab class (Master) - taught online (live sessions) - , ab 12.04.2021
Di, wöch., 11:00 - 12:30, Übung (Bachelor) - taught online (live sessions)- , ab 13.04.2021
Mo, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, schriftl. Prüfung / written exam, 27.09.2021 - 27.09.2021

Beschreibung

Im ersten Teil der Veranstaltung werden die wichtigsten Verfahren und Techniken aus dem Bereich der Informationsvisualisierung für folgende Datentypen vorgestellt: multi-dimensionale und hierarchische Daten, Graphen, Zeitreihen und mengenbasierte Daten. Der zweite Teil beschäftigt sich mit verschiedenen Ansätzen und Algorithmen zur Visualisierung volumetrischer und vektorieller Simulations- und Messdaten. Die Veranstaltung wird englischsprachig angeboten.

In den Übungen werden eine Auswahl der in den Vorlesungen vorgestellten Visualisierungsansätze umgesetzt, getestet und evaluiert. Ein separates Abschlussprojekt wird angeboten und mit zusätzlich 1,5 ETCS angerechnet.

Bemerkung

Bitte beachten Sie:
um 6ECTS Punkte zu erhalten, ist zusätzlich der Kurs "Visualization - Final Project" verpflichtend zu belegen.

Voraussetzungen

Programmierkenntnisse sowie gute Kenntnisse von Algorithmen und Datenstrukturen sind erforderlich, z.B. nachgewiesen durch den erfolgreichen Abschluss der entsprechenden Lehrveranstaltungen des Bachelor-Studiengangs Medieninformatik. In den Laborveranstaltungen werden JavaScript- und grundlegende GLSL-Programmierung eingesetzt. Grundkenntnisse der Computergrafik sind hilfreich, z.B. erworben durch die Vorlesung Computergrafik im Bachelor-Studiengang Medieninformatik.

Leistungsnachweis

Vorlesungsbegleitende Übungen, mündliche oder schriftliche Prüfung.

Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

420160006 Visualization - Final Project

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 1
Independent Study

Beschreibung

Im Abschlussprojekt der Vorlesung „Visualisierung" sollen die Teilnehmer die erlangten theoretischen und praktischen Fertigkeiten auf den Entwurf, die Implementierung und die Präsentation eines eigenständigen kleinen Forschungsprojektes anwenden. Dazu soll ein Problem ausgewählt, eine Lösung entwickelt, eine effiziente Implementierung realisiert und die Ergebnisse abschließend in einem Vortrag präsentiert werden.

Dies ist eine wertvolle Gelegenheit, an einem selbst gewählten Thema im Bereich der Visualisierung zu arbeiten.

Voraussetzungen

Erfolgreiche Teilnahme an der Vorlesung „Visualization"

Leistungsnachweis

Dokumentation, Abschlusspräsentation

205007 Modelling of steel structures and numerical simulation (L + E)

M. Kraus, S. Mämpel Veranst. SWS: 4
Vorlesung

1-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise
2-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Exercise
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise
Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal A, Lecture Hybrid
Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal B, Lecture Hybrid

Beschreibung

The students will be familiar with skills and expertise in the field of nonlinear structural analyses. Extensive knowledge of theoretical basics and modern modelling methods including numerical representations are the aim of the course. The students will acquire skills in handling advanced tools for the analysis and the design of structures.

Design of steel structures using finite element methods; basics of the design; modelling of structures and loads; nonlinear material behaviour, numerical analyses of steel-members and structures regarding geometric and physical nonlinearities; stability behaviour of members including flexural and lateral torsional buckling

Leistungsnachweis

1 Project report

"Modelling of steel structures and numerical simulation" (0%) / **SuSe**

1 written exam

"Modelling of steel structures and numerical simulation"/ 120 min (100%) / **SuSe** + WiSe

301005 Statistics

R. Illge Veranst. SWS: 4
Integrierte Vorlesung

Di, wöch., 13:30 - 15:00, lab class (online, live), ab 06.04.2021
Do, wöch., 07:30 - 09:00, Lecture (online) Moodle: https://moodle.uni-weimar.de/enrol/index.php?id=30709, ab 08.04.2021
Do, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal B, written exam, 29.07.2021 - 29.07.2021

engl. Beschreibung/ Kurzkommentar

Statistics

Contents:
- Probability (Events, classical probability, axiomatic approach, conditional probability)
- Random variables (Discrete random variables, continuous random variables, limit theorems)
- Descriptive statistics (Graphical representation and frequency distributions, location and scattering parameters, bivariate and multivariate analysis: dependence and correlation, regression analysis)
- Inductive statistics
- Point and interval estimation
- Parameter testing
- Goodness-of-fit-tests
- Nonparametric tests
- Tests for independence and correlation

Voraussetzungen

B.Sc. in a related study field, Basic knowledge on random variables and the most important distributions

Leistungsnachweis

Written exam

301013 Advanced modelling - calculation/CAE (L + E)

K. Gürlebeck, D. Legatiuk Veranst. SWS: 4

Vorlesung

Di, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

Beschreibung

Scientifically orientated education in mathematical modelling and computer science in view of a complex interdisciplinary and networked field of work and research, modelling and simulation.

Students will have experience in Computer Aided Engineering (CAE) by establishing a problem specific model on the basis of a mathematical formulation, an applicable solution technique, design of efficient data structures and software implementation.

Numerical and analytical solution of partial differential equations, series expansions, integral representations, finite difference methods, description of heat flow, diffusion, wave propagation and elastostatic problems.

The topics are discussed theoretically and then implemented.

Convergence, stability and error analysis of finite difference methods (FDM). Modelling of steady and unsteady heat conduction problems, wave propagation and vibrations and problems from linear thermo-elasticity in 2D and 3D. After considering the mathematical basis, the students will work on individual projects passing all levels of work (engineering model, mathematical model, numerical model, computer model, simulation, evaluation).

The solution methods will be implemented by help of MAPLE or MATLAB.

Bemerkung

This lecture replaces "Advanced Analysis". It is therefore not possible to receive credits for both courses.

Die Veranstaltung ersetzt "Advanced Analysis" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

Leistungsnachweis

1 Project report + Presentation

”Advanced Modelling – Calculation/CAE” (100%) / **SuSe**

303001 Advanced Building Information Modelling

C. Koch, M. Alabassy, J. Krischler Veranst. SWS: 4

Vorlesung

Do, wöch., 09:15 - 10:45, Lecture (online) Moodle: https://moodle.uni-weimar.de/course/view.php?id=31111, ab 08.04.2021
Mi, wöch., 09:15 - 10:45, Exercise (online), ab 14.04.2021
Fr, wöch., 07:30 - 09:00, Exercise (online) , ab 16.04.2021

engl. Beschreibung/ Kurzkommentar

Advanced Building Information Modelling

Content: Advanced geometric and parametric modelling, Interoperability and collaboration concepts (IFC, IDM, BEP), Advanced use cases (e.g. clash detection, as-built model-ing), BIM programming (incl. visual programming)

Target qualifications: This module introduces advanced concepts of Building Information Modelling (BIM) to provide students with advanced knowledge in order to understand, analyze and discuss scientific research approaches related to BIM. Within the frame of the mod-ule project (coursework) the students will choose a topic from a pre-defined list or come up with their own topic. Based on that they will do detailed research, imple-ment a representative concept in a software prototype and discuss findings and limi-tations. Also the students acquire skills of scientific working and presentation.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of Computer-Aided Design, BIM concepts, and object-oriented programming

Leistungsnachweis

written report, presentation

303002 Simulation Methods in Engineering

C. Koch, M. Artus Veranst. SWS: 4

Vorlesung

Fr, wöch., 09:15 - 10:45, Lecture (online) Moodle: https://moodle.uni-weimar.de/course/view.php?id=31066, ab 09.04.2021
Mo, wöch., 07:30 - 09:00, Exercise (online), ab 12.04.2021
Fr, wöch., 13:30 - 15:00, Exercise (online)

engl. Beschreibung/ Kurzkommentar

Simulation Methods in Engineering

Content:

- System analysis and modelling
- System dynamics
- Discrete event simulation
- Multi-agent simulation
- Input data and stochastic simulation
- Simulation based optimization
- Introduction to the software AnyLogic

Target qualifications:

This module provides students with comprehensive knowledge about computer based simulation concepts to address practical challenges in engineering. Modern simulation and optimization software is introduced within tutorials. The module project (coursework) offers an opportunity to students to work in groups on current problems in the context of civil and environmental engineering (e.g. production logistics, pedestrian simulation, pollutant dispersion). Using object-oriented simula-tion software the students will analyze, model and simulate different engineering systems. The programming is carried out using Java. Also the students acquire team working and presentation skills.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of programming

Leistungsnachweis

Short group report, group presentation, written exam

401007 Structural Engineering Models

C. Könke Veranst. SWS: 4

Integrierte Vorlesung

Mo, Einzel, 11:30 - 13:00, Marienstraße 13 C - Hörsaal A, written exam, 26.07.2021 - 26.07.2021
Di, wöch., 15:00 - 16:45, Marienstraße 13 C - Hörsaal D, Lecture (in person teaching/hybrid)
Do, wöch., 15:00 - 16:45, Marienstraße 13 C - Hörsaal C, Exercise (in person teaching/hybrid)

Beschreibung

Student will be able to build an abstract model for structural engineering problem and to assess its restriction and quality. The student will be able to perform dimen-sion reduction in structural engineering using concepts from structural mechanics. They will be capable of classify different types of civil engineering structures and to distinguish different principal load transfer processes. The student can classify line-ar/nonlinear problems and time variant/ invariant problems in structural engineering.

Fundamental equations in structural mechanics for 1D, 2D and 3D structures, equi-librium equation, kinematic relation, constitute law, Method to establish the govern-ing differential equations, Differences between geometric / physical linear and non-linear problems, Classification of different types of structures: truss, beam, plate, shell problems

Voraussetzungen

basic course in structural mechanics

basic course in applied mathematics

Leistungsnachweis

written test

Requirements for exam registration: 2 home works accepted

417290000 Software Engineering (M.Sc.)

N. Ruckel Veranst. SWS: 3

Vorlesung

Mo, wöch., 15:15 - 16:45, Lecture (online)https://moodle.uni-weimar.de/course/view.php?id=31474, ab 12.04.2021
Fr, wöch., 15:15 - 16:45, Exercise (online), ab 16.04.2021
Mo, Einzel, 09:00 - 11:00, Steubenstraße 6, Haus F - Hörsaal K20, written exam, 02.08.2021 - 02.08.2021

engl. Beschreibung/ Kurzkommentar

Software Engineering (M.Sc.)

Developing software requires more than just programming skills. Answering conceptual questions is perhaps even more important than excellent knowledge of a programming language. This course introduces participants to the basics of structured software development. During the course of a larger development project, the presented techniques will be exercised in practice. Topics include all phases of the development process, such as requirements analysis, UML modelling, design patterns or agile development.

Voraussetzungen

programming skills

Leistungsnachweis

Exercise assignments + written exam

4336010 Image Analysis and Object Recognition

V. Rodehorst, M. Kaisheva Veranst. SWS: 3

Vorlesung

Di, wöch., 09:15 - 10:45, Lecture (online,recorded sessions) Moodle: https://moodle.uni-weimar.de/course/view.php?id=30890 (Registration will be open from March 29, 2021 onwards.), ab 06.04.2021
Do, unger. Wo, 11:00 - 12:30, Lab (online), ab 15.04.2021
Di, Einzel, 09:00 - 11:00, written exam Location: Falkenburg, 27.07.2021 - 27.07.2021
Mo, Einzel, 09:00 - 12:00, Bauhausstraße 11 - Seminarraum 015, repeat exam (written exam), 06.09.2021 - 06.09.2021

Beschreibung

Bildanalyse und Objekterkennung

Die Vorlesung gibt eine Einführung in die Grundlagen der Mustererkennung und Bildanalyse. Behandelt werden unter anderem die Bildverbesserung, lokale und morphologische Operatoren, Kantenerkennung, Bilddarstellung im Frequenzraum, Fourier-Transformation, Hough-Transformation, Segmentierung, Skelettierung, Objektklassifizierung und maschinelles Lernen zur visuellen Objekterkennung.

engl. Beschreibung/ Kurzkommentar

Image analysis and object recognition

The lecture gives an introduction to the basic concepts of pattern recognition and image analysis. It covers topics as image enhancement, local and morphological operators, edge detection, image representation in frequency domain, Fourier transform, Hough transform, segmentation, thinning, object categorization and machine learning for visual object recognition.

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur (sowie des Final Projects für das Erreichen der 6 ECTS)

451002+45 Introduction to Optimization / Optimization in Applications (L)

T. Lahmer Veranst. SWS: 3

Vorlesung

Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Hybrid
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Hybrid

Beschreibung

Introduction to Optimization (451002):

Definitions, Classification of Optimization Problems, Linear Problems, Simplex Method, Duality, Optimization on Graphs Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants

Optimization in Applications (451006):

This course treats topics concerned with the combination of optimization methods and (numerical) models. Typical problems, where such combinations arise, are Calibration of Models, Inverse Problems; (Robust) Structural Optimization (including Shape and Topologyoptimization); Design of Experiments

Bemerkung

This course can be combined with Stochastic Simulation Techniques and Structural Reliability (L) to form a 6 CP module named Stochastic Simulation and Optimization.

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Introduction to Optimization” / (50%) / **WiSe** + SuSe

1 written or oral exam (depending on the number of participants)

”Optimization in Applications” / (50%) / **SuSe** + WiSe

4526501 Academic English Part One

G. Atkinson Veranst. SWS: 2
Kurs
Di, wöch., 17:00 - 18:30, Online (Moodle) , ab 20.04.2021

Beschreibung

This is the first part of a two-part course which aims to improve your ability to express yourself clearly in written English and to develop a suitably coherent academic writing style. Part One concentrates mainly on structure in writing academic articles, essays and reports. We begin by examining the structure of individual paragraphs and move on to extended texts of various types (e.g. process essays, cause/effect, comparison/contrast, etc.). Particular attention is paid to connectives, i.e. transitional phrases and constructions which help you link ideas and paragraphs in a logical, systematic way.

The course will be conducted basically in an online correspondence format with occasional video consultations and/or face-to-face teaching sessions if and as required. The time allocated for these is Tues 17.00-18.30. The individual dates, if required, will be determined as the course progresses

Bemerkung

You are advised to take Part One first, although it is possible to take both parts in reverse order or concurrently (i.e. in the same semester). You may only do the latter on the authority of the course leader (Atkinson).

Voraussetzungen

Registration (compulsory)

All students must register. First time particpants are required to present a B2 English Level certificate along with their email registration. All students, **including those who have already taken Academic English Part**

Two and those who need to repeat Academic English Part One, must register by contacting Howard Atkinson at: howard.atkinson@uni-weimar.de**.**

You will be informed by email when registration opens and when the deadline is. Please do not attempt to register until you have received this Email. Registration Emails should be given the subject heading: AE I Registration.

Leistungsnachweis

continuous assessment

4526502 Academic English Part Two

G. Atkinson Veranst. SWS: 2

Kurs

Mi, wöch., 17:00 - 18:30, Online (Moodle) , ab 21.04.2021

Beschreibung

Part Two of the Academic English course concentrates on improving and refining aspects of academic writing style. It includes sections on clause and sentence structure, punctuation rules and how to incorporate quotations, statistics and footnotes into academic texts.

The course will be conducted basically in an online correspondence format with occasional video consultations and/or face-to-face teaching sessions if and as required. The time allocated for these is Weds 17.00-18.30. The individual dates, if required, will be determined as the course progresses.

Bemerkung

You are advised to take Part One first, although it is possible to take both parts in reverse order or concurrently (i.e. in the same semester). You may only do the latter on the authority of the course leader (Atkinson).

Voraussetzungen

Registration (compulsory)

All students must register. First time particpants are required to present a B2 English Level certificate along with their email registration. All students, **including those who have already taken Academic English Part One and those who need to repeat Academic English Part Two,** must register by contacting Howard Atkinson at: howard.atkinson@uni-weimar.de**.**

You will be informed by email when registration opens and when the deadline is. Please do not attempt to register until you have received this Email. Registration Emails should be given the subject heading: AE II Registration.

Leistungsnachweis

continuous assessment

4555211 Algorithmen und Datenstrukturen

C. Wüthrich, F. Andreussi, Projektbörse Fak. KuG Veranst. SWS: 4

Vorlesung

Do, wöch., 11:00 - 12:30, Vorlesung / Lecture (online) https://moodle.uni-weimar.de/course/view.php?id=31390, ab 15.04.2021
Fr, wöch., 11:00 - 12:30, Übung / Exercise (online), ab 23.04.2021
Fr, wöch., 15:15 - 16:45, Übung / Exercise (online), ab 23.04.2021

Do, Einzel, 10:00 - 12:00, Prüfung / exam Falkenburg / Innensporthalle, 05.08.2021 - 05.08.2021

Beschreibung

Das Lernziel dieser Veranstaltung soll zum einen der generelle Umgang und die selbstständige Entwicklung, Analyse, und Optimierung von Algorithmen und Datenstrukturen sein. Zum anderen soll ein Überblick über gängige problemspezifische Verfahren und deren Anwendung in der Praxis vermittelt werden.

engl. Beschreibung/ Kurzkommentar

Algorithms and Data Structures

The lecture deals with the principle and the implementation of basic algorithms and data structures. The course teaches among all, the Strings, geometric problems, graphs, mathematical algorithms and NP-complete problems.

Leistungsnachweis

Beleg, Klausur

4556105 Advanced Numerical Mathematics

K. Gürlebeck, D. Legatiuk Veranst. SWS: 4

Vorlesung

Mo, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2, Lecture (hybrid), ab 12.04.2021
Mo, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Exercise (hybrid), ab 12.04.2021
Mo, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Seminarraum 210, written exam, 09.08.2021 - 09.08.2021

Beschreibung

Höhere Numerik

Effiziente Lösung linearer und nichtlinearer Gleichungssysteme;
• Diskretisierungsmethoden für verschiedene Typen partieller Differentialgleichungen
• Projektionsverfahren, Stabilität, Konvergenz und Konditionszahl
• Direkte Löser für schwach besetzte Systemmatrizen
• Fixpunktsatz, iterative Löser, Gesamtschrittverfahren, Einzelschrittverfahren, Gradientenverfahren, Relaxationsverfahren, Multiskalenmethoden und Überblick über andere Zugänge
• Eigenwertprobleme, iterative Löser
• Gebietszerlegungsverfahren

engl. Beschreibung/ Kurzkommentar

Advanced Numerical Mathematics

Efficient solution of linear and non-linear systems of algebraic equations;
• Discretization methods for different types of partial differential equations
• Projection methods, stability and convergence, condition number
• Direct solvers for sparse systems
• Fixed-point theorem, iterative solvers: Total step method, single step method, gradient methods, relaxation methods, multiscale methods and a survey on other approaches
• Eigenvalue problems, iterative solvers
• Domain decomposition methods

Voraussetzungen

Courses in Linear Algebra, Analysis

Leistungsnachweis

Project

Project

421110000 Applied Deep Learning for Computer Vision

V. Rodehorst, J. Eick, D. Tschirschwitz
Projekt

Beschreibung

During this practice-oriented Deep Learning project, we will implement current state-of-the-art models for solving difficult tasks in the field of computer vision. During the course of the project the participants will learn how to implement and adapt models for image classification, segmentation, etc to varying problem domains. The landscape of data driven approaches is rapidly changing and researchers need a good understanding of the required tools, publicly available datasets and methods. The students will learn the design and evaluation of existing models, and how to leverage these skills to adapt and implement own models.

Bemerkung

Mandatory technology stack (no other framework allowed):

- Python

- PyTorch

Voraussetzungen

Successful completion of the course "Image Analysis and Object Recognition"

Good programming skills in Python

Leistungsnachweis

Active participation, presentations and project documentation (e.g. commented repositories)

421110003 FL BaSe – Formal-Language Based Security

S. Lucks, J. Boßert, N. Lang Veranst. SWS: 10
Projekt

Beschreibung

Wenn binäre Daten als Byte-Strom verschickt werden, braucht man eine „Datenserialisierungssprache” (DSL).
Im Unterschied zu menschenlesbaren Sprachen gibt es viele DSLs, die Daten variabler Länge als Längenpräfix-Sprachen implementieren. Das Ziel des Projektes besteht darin, eine Erweiterung der EBNF (der „extended Backus-Naur Form”) einzuführen, und einen Prototyp für einen Parser- Generator für derartige Sprachen zu implementieren.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Discrete Mathematics
Formal Languages
Solid programming skills

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht

421110005 Hot Topics in Computer Vision SoSe21

V. Rodehorst, C. Benz, P. Debus, M. Kaisheva
Projekt

Beschreibung

Die Teilnehmer werden an ein aktuelles forschungs- oder industrierelevantes Thema herangeführt. Es ist nicht beabsichtigt einen festgelegten Bereich in voller Breite zu explorieren. Stattdessen werden die Teilnehmer mit der vollen Komplexität eines begrenzten Themas konfrontiert und die Eigeninitiative gefördert. Es ermöglicht einen Einblick in die Forschungs- und Entwicklungsprojekte des Fachgebiets.

Bemerkung

Ort und Zeit werden zur Projektbörse bekanntgegeben.

Voraussetzungen

Gute Programmierkenntnisse (z.B. C/C++, MATLAB, OpenCL)

Leistungsnachweis

Aktive Mitarbeit, Einführungsvortrag, Abschlusspräsentation, Dokumentation

421110014 SACPC – Simulation von Probabilistischen Schaltkreisen

A. Jakoby Veranst. SWS: 10
Projekt

Beschreibung

Probabilistische Schaltkreise stellen ein Modell zur Simulation von analogen Berechnungen. In diesem Projekt sollen die unterschiedlichen Modelle von probabilistischen Schaltkreisen und deren Anwendbarkeit für analoge Berechnungen untersucht werden.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Programmierkenntnisse (Python)

Leistungsnachweis

Zwischen- und Abschlusspräsentation, Dokumentation

421110019 NAIS – Network Attached Insecurities

S. Lucks, J. Boßert, N. Lang Veranst. SWS: 10
Projekt

Beschreibung

Das Internet of Things (IoT) wächst beständig und täglich kommen neue Produkte heraus. Diese bringen verschiedenste Sensoren und Kontrollmechanismen in das Haus der Kunden, welche deren Leben vereinfachen sollen. Jedoch sind diese Geräte oftmals nicht zureichend vor dem Zugriff von Außenstehenden geschützt. In diesem Projekt sollen verschiedene IoT Produkte in dieser Hinsicht untersucht werden.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Solid programming skills
And at least one of the following:
• Introduction to Modern Cryptography
• Experience with microcontrollers

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht