

Vorlesungsverzeichnis

M.Sc. Digital Engineering

Winter 2017/18

Stand 07.05.2018

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M.Sc. Digital Engineering**Fundamentals (F)****Algorithms and Datastructures****Applied Mathematics and Stochastics****2301012-1 Applied mathematics (Lecture)****K. Gürlebeck**

Veranst. SWS: 2

Vorlesung

Di, wöch., 13:30 - 15:00, Coudraystraße 13 A - Hörsaal 2

Beschreibung**Applied mathematics:**

Fundamentals of linear algebra, eigenvalue problems, fixed point principles, solvers; Fourier series, convergence, Fourier transform, Laplace transform; Solution of initial value problems, boundary value problems and eigenvalue problems for ordinary differential equations; All topics are discussed from the mathematical point of view and their implementation in MAPLE will be studied. :

Leistungsnachweis

Klausur oder mündliche Prüfung

2301012-2 Stochastics for risk assessment (Lecture) / Mathematics for risk management (MBM)**T. Lahmer**

Veranst. SWS: 2

Vorlesung

Fr, Einzel, 11:00 - 12:30, Marienstraße 13 C - Hörsaal B, Prüfung, 09.02.2018 - 09.02.2018

Mo, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal B, Prof. Lahmer

Beschreibung**Stochastics for risk assessment:**

Introduction to probability theory with focus on situations characterized by low probabilities. Random events, discrete and continuous random variables and associated distributions. Descriptive statistics, parameter estimation. Risk Assessment by means of FORM and Monte Carlo Simulations. Introduction to reliability theory: Extreme value distributions; stochastic modeling with software tools e.g. MATLAB, Octave, Excel, R. Reliability Analysis of Systems. Catastrophic events + risk problems, Applications

Leistungsnachweis

Klausur oder mündliche Prüfung

Nonlinear Continuum Mechanics**Numerical Linear Algebra****Software Engineering****Structural Dynamics**

2401007-2 Structural Dynamics (Exercise)**V. Zabel**

Veranst. SWS: 1

Seminar

1-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205, Tutorium - Group A
 1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Group A, bis 06.12.2017
 2-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 206, Tutorium - Group B
 2-Gruppe Di, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 302, Group B, bis 05.12.2017
 3-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205, Tutorium - Group C
 3-Gruppe Mi, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 302, Group C, bis 06.12.2017

2401007-2 Structural Dynamics (Lecture)**V. Zabel**

Veranst. SWS: 2

Vorlesung

Mi, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 105, 07.02.2018 - 07.02.2018
 Mi, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 106, 07.02.2018 - 07.02.2018
 Mi, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 205, 07.02.2018 - 07.02.2018
 Mi, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 206, 07.02.2018 - 07.02.2018
 Mi, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 103, 07.02.2018 - 07.02.2018
 Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal C, bis 29.11.2017
 Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, bis 30.11.2017

Beschreibung**Structural Dynamics:** (50% of semester course time)

SDOF systems: free vibrations, harmonic, impulse and general excitation for undamped and damped systems, Impulse response function, frequency response function, base excitation, time step analysis: central difference and Newmark methods; MDOF systems: modal analysis, modal superposition, modal damping, Rayleigh damping, Frequency response functions, state-space models

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis**1 written exam:** „Fundamentals of structural dynamics“/ 90 min (50%)**2401011 Applied Structural Dynamics (Exercise)**

Veranst. SWS: 1

Seminar

1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Group A, ab 13.12.2017
 2-Gruppe Di, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 302, Group B, ab 12.12.2017
 3-Gruppe Mi, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 302, Group C, ab 13.12.2017

2401011 Applied Structural Dynamics (Lecture)**V. Zabel**

Veranst. SWS: 2

Vorlesung

Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal C, ab 06.12.2017
 Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, ab 07.12.2017
 Fr, Einzel, 09:15 - 10:45, Marienstraße 7 B - Seminarraum 105, Tutorial, 19.01.2018 - 19.01.2018

Fr, Einzel, 09:15 - 10:45, Marienstraße 7 B - Seminarraum 106, Tutorial, 19.01.2018 - 19.01.2018
 Mi, Einzel, 10:45 - 12:15, Marienstraße 7 B - Seminarraum 205, 07.02.2018 - 07.02.2018
 Mi, Einzel, 10:45 - 12:15, Marienstraße 7 B - Seminarraum 206, 07.02.2018 - 07.02.2018

Structural Engineering Models

Modelling (M)

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

Advanced Building Information Modeling

Advanced Modelling - Calculation

Collaborative Data Management

Computer models for physical processes - from observation to simulation

Introduction to Optimization

Modelling in the development process

Optimization in Applications

Simulation and Validation (SaV)

Design and Interpretation of Experiments / Signal Processing

Extended Finite Elements and Mesh Free Methods

Linear FEM

2401007-1 Finite element methods (Exercise)

C. Könke, C. Zacharias

Veranst. SWS: 1

Seminar

1-Gruppe Mi, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Group A, bis 06.12.2017
 2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Group B, bis 06.12.2017
 3-Gruppe Di, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Group C, bis 05.12.2017

2401012 Applied Finite element methods (Exercise)

C. Könke

Veranst. SWS: 1

Seminar

1-Gruppe Mi, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Group A, ab 13.12.2017
 2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Group B, ab 13.12.2017
 3-Gruppe Di, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Group C, ab 12.12.2017

2401012 Applied Finite element methods (Lecture)**C. Könke**

Veranst. SWS: 2

Vorlesung

Do, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal C, ab 07.12.2017

Do, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal C, ab 07.12.2017

Fr, Einzel, 10:45 - 12:15, Marienstraße 7 B - Seminarraum 205, 16.02.2018 - 16.02.2018

Fr, Einzel, 10:45 - 12:15, Marienstraße 7 B - Seminarraum 206, 16.02.2018 - 16.02.2018

Modelling of Steel Structures and Numerical Simulation**Nonlinear FEM****Process modelling and simulation in logistics and construction****Simulation Methods in Engineering****Stochastic Simulation Techniques and Structural Reliability****Structural Health Monitoring****907004 Fundamentals of structural health monitoring (SHM) and intelligent structural systems****K. Smarsly, E. Tauscher, M. Theiler, M. Steiner, J. Wagner**

Integrierte Vorlesung

Mi, wöch., 09:15 - 12:30, Coudraystraße 13 D - Pool-Raum 010

Beschreibung

Structural health monitoring (SHM) and smart structural systems, also referred to as "smart structures" or "intelligent infrastructure", are primary subjects of this course: Basic principles of modern SHM are taught; also, concepts of smart structural systems, which are capable of self-assessing their structural condition with a certain degree of intelligence, are elucidated in more detail. Measuring techniques, data acquisition systems, data management and processing as well as data analysis algorithms will be discussed. Furthermore, approaches towards autonomous and embedded computing, to be used for continuous (remote) monitoring of civil infrastructure, are presented. Throughout the course, a number of illustrative examples is shown, demonstrating how state-of-the-art SHM systems and smart structural systems are implemented. In small groups, the students design structural health monitoring systems that are validated in the field. The outcome of every group is to be documented in a paper, which is graded, together with an oral examination, at the end of the course. Prerequisites for this course: Object-oriented modeling and Java programming language. Requirements for examination: (i) Development of a wireless SHM system, (ii) participation in the project work (including the laboratory test), (iii) written paper. No previous experience in the above fields is required by the students; limited enrollment.

Bemerkung

Please note: Time and location will be announced. Enrollment must be done online.

Information on how to enroll will be provided in the first lecture on October 11, 2017 (9:15am), Coudraystr. 13D, Orion-Pool.

Voraussetzungen

Object-oriented modeling and Java programming language.

Basic knowledge in structural dynamics would be an advantage.

Leistungsnachweis

Oral examination and written paper.

System and Parameter Identification

Visualization and Data Science (VaDS)

Image Analysis and Object Recognition

Introduction to Machine Learning

Machine Learning for Software Engineering

Photogrammetric Computer Vision

Search Algorithms

Software Product Line Engineering

Visualization

Elective Modules

Project