

Vorlesungsverzeichnis

M.Sc. Natural hazards and risk in structural engineering (as from Intake 2017/2018)

Sommer 2018

Stand 16.10.2018

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M.Sc. Natural hazards and risk in structural engineering (as from Intake 2017/2018)**Applied mathematics and stochastics for risk assessment****Re-Examination "Applied mathematics and stochastics for risk assessment"****K. Gürlebeck, T. Lahmer**

Prüfung

Mo, Einzel, 13:00 - 16:00, Marienstraße 13 C - Hörsaal B, 23.07.2018 - 23.07.2018

Disaster management and mitigation strategies**Earthquake engineering and structural design****202002 Earthquake engineering and structural design (L)****J. Schwarz**

Veranst. SWS: 6

Vorlesung

1-Gruppe Di, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, NHRE - Group A, ab 10.04.2018
 2-Gruppe Do, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, NHRE - Group B, ab 12.04.2018
 3-Gruppe Do, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, NHRE - Group C, ab 12.04.2018
 Di, Einzel, 13:00 - 16:00, Marienstraße 13 C - Hörsaal A, Final examination, 17.07.2018 - 17.07.2018
 Di, Einzel, 13:00 - 16:00, Marienstraße 13 C - Hörsaal B, Final examination, 17.07.2018 - 17.07.2018
 Do, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal C

Beschreibung

Methodologies of hazard and risk assessment, description of seismic action; design principles; building codes; rules for engineered (RC, steel, masonry) and non-engineered buildings; lessons from recent earthquakes; damage analysis and loss estimation (earthquake scenarios), computer exercises on data processing and analysis of RC frame structures, GIS-Tools and application to study areas

Leistungsnachweis

Klausur oder mündliche Prüfung

Finite element methods and structural dynamics**Re-Examination "Finite element methods (FEM)"****C. Könke**

Prüfung

Fr, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 205, 27.07.2018 - 27.07.2018
 Fr, Einzel, 09:00 - 10:30, Marienstraße 7 B - Seminarraum 206, 27.07.2018 - 27.07.2018

Re-Examination "Structural Dynamics"**V. Zabel**

Prüfung

Mi, Einzel, 13:00 - 14:30, Marienstraße 7 B - Seminarraum 205, 18.07.2018 - 18.07.2018
 Mi, Einzel, 13:00 - 14:30, Marienstraße 7 B - Seminarraum 206, 18.07.2018 - 18.07.2018

Tutorial "Structural Dynamics"

V. Zabel

Sonstige Veranstaltung

Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 105, ab 07.06.2018

Geo- and hydrotechnical engineering

202003 Flood Hazard and Vulnerability Assessment (L+P)

H. Maiwald

Veranst. SWS: 3

Vorlesung

Do, Einzel, 09:00 - 10:30, Marienstraße 13 C - Hörsaal A, Final examination, 26.07.2018 - 26.07.2018

Do, Einzel, 09:00 - 10:30, Marienstraße 13 C - Hörsaal B, Final examination, 26.07.2018 - 26.07.2018

Mi, wöch., 09:15 - 12:30, Marienstraße 13 C - Hörsaal C

Beschreibung

Flood Hazard and Vulnerability Assessment:

Flood Management; Fundamentals of flood defense; Management of low-lying areas; Design of river dikes, channels and dams; Design concepts for the defense of structural objects and buildings; Forecasting, management and maintenance in flood defense; Hydrology, hydraulic calculations, flood routing; Characteristics of tsunami action, forces and loads on structures; Structural damage and loss prediction, damage scenarios; Re-interpretation of recent events.

engl. Beschreibung

Management, defence and calculation of extreme floods:

Design flood; Hydrology; Flood types; Hydraulic calculations; Basins; Flood areas; Dams; Flood dams; Flood walls; Mobile flood protection; Flood protection by flood areas; Flood alarm and control systems; Flood activity plans; Master plan; Flood area management; Flood precaution; Damage assessment.

Bemerkung

Vorlesungen in englischer Sprache "Flood Management"

Leistungsnachweis

1 written exam - 90 Min.

906014 Geotechnical Engineering

T. Wichtmann

Veranst. SWS: 3

Vorlesung

Di, Einzel, 13:00 - 15:00, Coudraystraße 11 C - Seminarraum 101, Final Examination, 24.07.2018 - 24.07.2018

Di, Einzel, 13:00 - 15:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, Final Examination, 24.07.2018 - 24.07.2018

Di, Einzel, 13:00 - 15:00, Coudraystraße 13 B - Seminarraum 208, Final Examination, 24.07.2018 - 24.07.2018

Di, Einzel, 13:00 - 15:00, Coudraystraße 13 B - Seminarraum 210, Final Examination, 24.07.2018 - 24.07.2018

Di, wöch., 13:30 - 16:45, Coudraystraße 9 A - Hörsaal 6

Di, wöch., 15:15 - 16:45, Coudraystraße 11 C - Seminarraum 101

Di, wöch., 15:15 - 16:45, Coudraystraße 13 A - Seminarraum 115

Di, wöch., 15:15 - 16:45, Coudraystraße 13 B - Seminarraum 208

Beschreibung

Classification and identification of soils; Description of soil state; Water in the soil; Hydraulic conductivity and seepage flow; Distribution of vertical stress in the soil; Stress-strain relationships; Settlement analysis; Consolidation theory; Shear strength; Earth pressure; Basics of Soil Dynamics (wave propagation, laboratory and field testing, soil-structure interaction under dynamic loading); Soil Liquefaction (phenomenon, consequences, estimation of liquefaction risk, prevention)

Leistungsnachweis

Written Exam - 90 Min.

Geographical Information Systems (GIS) and building stock survey

Life-lines engineering

Primary hazards and risks

Re-Examination "Seismic monitoring/Reg.ground mot."

J. Schwarz

Prüfung

Fr, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 205, 20.07.2018 - 20.07.2018

Re-Examination "Wind engineering"

G. Morgenthal

Prüfung

Fr, Einzel, 13:00 - 14:30, Marienstraße 7 B - Seminarraum 205, 20.07.2018 - 20.07.2018

Structural engineering

205013 Structural engineering – Advanced systems (Lecture)

M. Kraus, G. Morgenthal, B. Wittor

Veranst. SWS: 3

Vorlesung

Mo, Einzel, 13:30 - 15:00, Marienstraße 13 C - Hörsaal A, Final Examination, 30.07.2018 - 30.07.2018

Mo, Einzel, 13:30 - 15:00, Marienstraße 13 C - Hörsaal B, Final Examination, 30.07.2018 - 30.07.2018

Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D

Beschreibung

Design of steel and steel-concrete composite structures; Post-tensioned concrete structures – design and detailing; Design of steel connections and detailing

Bemerkung

Start on 23.11.

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis

Written exam - 90 Min.

Re-Examination "Structural engineering - Standard systems"

G. Morgenthal

Prüfung

Mi, Einzel, 13:30 - 15:00, Marienstraße 7 B - Seminarraum 205, 25.07.2018 - 25.07.2018

Mi, Einzel, 13:30 - 15:00, Marienstraße 7 B - Seminarraum 206, 25.07.2018 - 25.07.2018

Structural parameter survey and evaluation

204018 Structural parameter survey and evaluation (L + E + P)

G. Morgenthal, V. Rodehorst, R. Illge, S. Rau

Veranst. SWS: 4.5

Vorlesung

Do, Einzel, 11:00 - 12:30, Marienstraße 13 C - Hörsaal A, 05.04.2018 - 05.04.2018

Do, Einzel, 17:00 - 18:30, Marienstraße 13 C - Hörsaal A, 05.04.2018 - 05.04.2018

Fr, wöch., 09:15 - 15:00, Marienstraße 13 C - Hörsaal A, ab 15.06.2018

Do, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal B, Final Examination, 02.08.2018 - 02.08.2018

Do, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal D, Final Examination, 02.08.2018 - 02.08.2018

Beschreibung

Signal Analysis:

Trigonometric polynomials (TP); amplitude-phase and complex representation; approximation of arbitrary periodic functions by TP using method of least squares, calculation of Fourier coefficients and error estimation; Fourier series. Discussion of spectra and Fourier transform and its basic properties; Convolution and its properties and applications; random variables and central limit theorem; applications of Fourier transforms such as filtering of signals and solving differential equations

Sensor-based Monitoring and System Analysis:

Types and principles of sensors; important sensor properties; data acquisition techniques; spectral and stochastic analysis of sensor data; properties of structural systems important in experimental testing and structural health monitoring; relevant limit states; structural analysis, modelling and model calibration; applications to static and dynamic response, load determination, physically nonlinear structural behavior and optimization of sensor system setups

Geo-spatial Monitoring:

Preparation and planning of three-dimensional measurement tasks; application of tacheometry, satellite-based positioning (GNSS), terrestrial laser scanning and photogrammetry for monitoring; image-based sensor orientation and surface reconstruction; spatial transformations, georeferencing, distance measures, pointcloud registration and geometric deformation analyses

Bemerkung

The students will be familiar with methods to determine properties of structural systems by means of modern measurement techniques. They will be familiar with the concepts, the application and the limitations of these techniques. They understand the data obtained and the methods to condition, analyse and interpret the data to extract information about structures and structural members and components. They will be able to apply the concepts to develop measurement setups and analysis procedures to problems encountered in structural engineering.

Leistungsnachweis

1 written exam - 120 Min.

Elective compulsory modules

202004 Multi-Hazard and risk assessment (L + E)

J. Schwarz, S. Beinersdorf

Veranst. SWS: 4

Vorlesung

Mi, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal A, Final Examination, 01.08.2018 - 01.08.2018

Mo, wöch., 15:15 - 18:30, Marienstraße 7 B - Projektraum 301

Mo, wöch., 15:15 - 18:30, Marienstraße 13 C - Hörsaal C

Bemerkung

Die Durchführung der Lehrveranstaltung ist abhängig von der Anzahl der Interessenten. Interessenten wenden sich betreffs Terminabstimmung bitte an die für die Lehrveranstaltung verantwortliche Professur. Die Veranstaltungen finden im Comp. lab Luna Pool Marienstraße 7 statt.

Leistungsnachweis

Projekt und Präsentation

204016 Model Validation and Simulation - "Project Wind Engineering"

G. Morgenthal, T. Abbas, S. Chawdhury, I. Kavrakov

Veranst. SWS: 4

Projekt

Mi, wöch., 13:30 - 16:45, Marienstraße 7 B - Seminarraum 205

Mi, wöch., 13:30 - 16:45, Marienstraße 7 B - Projektraum 301

205007 Modelling of steel structures and numerical simulation

M. Kraus, S. Mämpel, B. Wittor

Veranst. SWS: 4

Vorlesung

Do, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal D, Final Examination, 19.07.2018 - 19.07.2018

Mo, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal D

Mo, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301

Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Examination

Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301

engl. Beschreibung

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

2202007 Nonlinear Analysis of Structures: Seismic Response of RC Bridges - Blind Prediction

L. Abrahamczyk, B. Bode

Integrierte Vorlesung

2402007 Finite element application with Ansys**A. Jenabidehkordi, T. Rabczuk**

Seminar

Mo, wöch., 15:15 - 18:30, Coudraystraße 13 D - Pool Fak. B 009

301013 Advanced Modelling – Calculation/CAE**K. Gürlebeck, D. Legatiuk**

Veranst. SWS: 4

Vorlesung

Mi, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Seminarraum 210, Final Examination, 25.07.2018 - 25.07.2018

Di, wöch., 09:15 - 12:30, Coudraystraße 13 B - Seminarraum 210

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 exam (written or oral)

303001 Advanced Building Information Modelling**C. Koch, E. Tauscher, K. Smarsly, T. Behnke, J. Wagner**

Veranst. SWS: 4

Vorlesung

Do, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, lab, ab 05.04.2018

Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal B, lecture, ab 11.04.2018

Do, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 302, lab, ab 12.04.2018

Fr, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, lab, ab 20.04.2018

Fr, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, lab, ab 20.04.2018

Mi, Einzel, 11:00 - 12:30, Coudraystraße 13 A - Hörsaal 2, lecture, 16.05.2018 - 16.05.2018

Mo, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal A, 16.07.2018 - 16.07.2018

engl. Beschreibung

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, Marienstraße 13 C - Hörsaal D, lecture, ab 06.04.2018

Fr, wöch., 13:30 - 15:00, lab 303, M7b (5mal), ab 06.04.2018

Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, lab (7mal), ab 06.04.2018

Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302, lab (7 mal), ab 13.04.2018

Mo, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, lab, ab 16.04.2018

Mo, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, lab, ab 16.04.2018

engl. Beschreibung

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

Di, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal A, ab 24.04.2018

Do, unger. Wo, 15:15 - 16:45, Marienstraße 13 C - Hörsaal B, ab 26.04.2018

Fr, Einzel, 13:00 - 15:00, Marienstraße 13 C - Hörsaal A, Final examination, 27.07.2018 - 27.07.2018

Di, wöch., 15:15 - 16:45, Marienstraße 7 B - Seminarraum 205

Do, wöch., 15:15 - 16:45, Marienstraße 7 B - Seminarraum 105

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 dimension 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, equilibrium equation, kinematic relation, constitute law, Method to establish the governing 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

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

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

Bemerkung

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.

14 students NHRE only

Voraussetzungen

Structural dynamics

Leistungsnachweis

Project report, presentation

Excursion from 11.05 to 15.05.2015 to University of Thessaloniki

451002+45 Introduction to Optimization / Optimization in Applications**T. Lahmer**

Veranst. SWS: 4

Vorlesung

Fr, Einzel, 13:00 - 15:00, Marienstraße 13 C - Hörsaal A, Final Examination, 20.07.2018 - 20.07.2018

Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal B

Mi, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal C

Beschreibung**Introduction to Optimization (451002 - 3ECTS):**

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 - 3 ECTS):

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

The course can be regarded as a continuation of „Introduction to Optimization“, however a visit of that course is not mandatory.

Leistungsnachweis

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

„Introduction to Optimization“/ (50%)

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

„Optimization in Applications“/ (50%)

Re-Examination "Applied Finite element methods (Applied FEM)"**C. Könke**

Prüfung

Fr, Einzel, 10:45 - 12:15, Marienstraße 7 B - Seminarraum 205, 27.07.2018 - 27.07.2018

Re-Examination "Applied Structural Dynamics"**V. Zabel**

Prüfung

Mi, Einzel, 14:45 - 16:15, Marienstraße 7 B - Seminarraum 205, 18.07.2018 - 18.07.2018