Bauhaus-Universität Weimar

Vorlesungsverzeichnis

M.Sc. Natural hazards and risk in structural engineering (up to Intake 2016/2017)

Sommer 2018

Stand 16.10.2018

M.Sc. Natural hazards and risk in structural engineering (up to Intake 2016/2017)

Wahlpflichtmodul I

Wahlpflichtmodul II

Wahlpflichtmodul III

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

Experimental structural evaluation and rehabilitation

Re-Examination "Experimental structural evaluation and rehab."

M. Kraus, T. Lahmer, J. Schwarz
Prüfung
Do, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 205, 26.07.2018 - 26.07.2018

Finite element methods

Structural dynamics

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

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

Geo- and hydrotechnical engineering

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

Hazard projects and advanced geotechnologies

Life-lines engineering

Re-Examination "Life-lines engineering"

G. Morgenthal
Prüfung
Do, Einzel, 13:00 - 16:00, Marienstraße 7 B - Seminarraum 205, 19.07.2018 - 19.07.2018

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

Disastermanagement and mitigation strategies

2901005 Project- and Disaster Management

H. Bargstädt Veranst. SWS: 3
Integrierte Vorlesung
Fr, Einzel, 13:30 - 18:30, Marienstraße 13 C - Hörsaal A, 27.04.2018 - 27.04.2018
Sa, Einzel, 09:15 - 15:00, Marienstraße 13 C - Hörsaal A, 28.04.2018 - 28.04.2018
So, Einzel, 09:15 - 12:30, Marienstraße 13 C - Hörsaal A, 29.04.2018 - 29.04.2018

Beschreibung

Acquisition of knowledge of the methods of the project management and acquisition of skills with their practical application:
Imparting of means and methods as well as of social and technical aspects of the project management in the construction industry (the-oretical and on the basis practical examples)
Consolidate of knowledge in handling a project management soft-ware

Additional: Lecture of "Postwar cities"

Bemerkung

Modul "Disaster management and mitigation strategies" --> 6 ECTS

Part "Mitigation strategies" --> see lecture "Postwar cities"

Leistungsnachweis
Klausur oder mündliche Prüfung

Stochastics and risk assessment

Structural engineering

Elective compulsory modules

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 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

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 "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 "Secondary hazards and risks "

T. Wichtmann
Prüfung
Fr, Einzel, 13:00 - 15:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, 20.07.2018 - 20.07.2018