

Vorlesungsverzeichnis

M.Sc. Natural hazards and risk in structural engineering

Sommer 2014

Stand 01.10.2014

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M.Sc. Natural hazards and risk in structural engineering**Wahlpflichtmodul I****Wahlpflichtmodul II****Wahlpflichtmodul III****Earthquake engineering and structural design****Earthquake Engineering****J. Schwarz**

Veranst. SWS: 6

Vorlesung

Do, Einzel, 13:30 - 16:45, Marienstraße 7 B - Seminarraum 205, 24.04.2014 - 24.04.2014

Do, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301

Do, wöch., 11:00 - 12:30, Marienstraße 7 B - Seminarraum 205

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

Do, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal C

Kommentar

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

Examination "Earthquake engineering and structural design"**J. Schwarz**

Prüfung

Di, Einzel, 10:00 - 13:00, Marienstraße 13 C - Hörsaal C, 15.07.2014 - 15.07.2014

Experimental structural evaluation and rehabilitation**Finite element methods****Finite element methods****T. Rabczuk**

Veranst. SWS: 4

Integrierte Vorlesung

Mi, wöch., 09:15 - 10:45, Marienstraße 7 B - Seminarraum 205

Do, wöch., 09:15 - 10:45, Marienstraße 7 B - Seminarraum 205

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

Kommentar

Gemischte Finite Elemente Modelle, lineare FE-Analyse in der Strukturmechanik, geometrisch und physikalisch nichtlineare Effekte; Iterative Lösungen von nichtlinearen Gleichungssystemen, Fehlerindikatoren und adaptive FE-Verfahren.

Mixed finite element models; non-linear finite element analysis in solid mechanics (teometrically and physicalle non-linear methods); solution of equilibrium uquations; error estimates and adaptive finite element methods

Leistungsnachweis

Klausur oder mündliche Prüfung

Structural dynamics

Geo- and hydrotechnical engineering

Examination "Geo- and hydrotechnicak engineering" (Part: Soil mechanics)

K. Witt

Prüfung

Di, Einzel, 09:00 - 11:00, Coudraystraße 11 C - Seminarraum 101, 22.07.2014 - 22.07.2014

Di, Einzel, 09:00 - 11:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, 22.07.2014 - 22.07.2014

Flood Management

H. Hack

Veranst. SWS: 2

Vorlesung

Fr, wöch., 09:15 - 10:45, Marienstraße 7 B - Seminarraum 205, 04.04.2014 - 11.04.2014

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

Bemerkung

Vorlesungen in englischer Sprache "Flood Management"

Kommentar

Risikomanagement im Hochwasserschutz; hydrologische Bemessungsgrundlagen;hydraulische Berechnungen; technischer Hochwasserschutz; Hochwasserschutz durch Überschwemmungsflächen; Hochwasservorsorge.

Leistungsnachweis

Klausur oder mündliche Prüfung

Soil Mechanics

K. Witt, F. Wuttke

Veranst. SWS: 4

Vorlesung

Fr, Einzel, 16:00 - 20:00, Marienstraße 7 B - Projektraum 301, 27.06.2014 - 27.06.2014

Fr, Einzel, 16:00 - 20:00, Marienstraße 7 B - Seminarraum 206, 27.06.2014 - 27.06.2014

Sa, Einzel, 09:00 - 15:00, Marienstraße 7 B - Seminarraum 206, 28.06.2014 - 28.06.2014

Sa, Einzel, 09:00 - 15:00, Marienstraße 7 B - Projektraum 301, 28.06.2014 - 28.06.2014

Di, wöch., 13:30 - 16:45, Coudraystraße 11 C - Seminarraum/Hörsaal 001

Kommentar

Problematic Soils: Type of soils, minerals, natural soils, expansive soils, collapsible soils, physical behaviour, physico-chemical behaviour, structure, fabric, saturated soils, unsaturated soils, volume-mass relationships, shrinkage behaviour, consolidation behaviour, compaction, effective stress, stress state variables, constitutive relations, shear strength, measurement of positive pore water pressure, negative pore water pressure (laboratory, field), soil-water characteristic curves, saturated and unsaturated hydraulic conductivity, sa-turated and unsaturated shear strength, volume change behaviour of problematic soils, earth pressure theory, bearing capacity, slope stability, constitutive modelling, analysis and design of structures on problematic soils. Geotechnical Earthquake

Engineering: Artificial and natural earthquake loads (different scales) and their change (magnitude and frequencies) are described when crossing sediment layers. Furthermore the effects of these earthquakes on geotechnical and building constructions as well as geo-seismic effects (liquefaction, landslides, and settlements) are analysed. We use the special site effects for the determination of site dependent response spectra and the microzonation of affected areas. For all site response analyses the description of the soil properties and the realistic soil parameters will be needed. That means the pre-failure and failure characteristics of the soil, i.e. the stiffness and damping for all rates of strain or the liquefaction potential. For these purposes experimental methods will be discussed just as recent aspects of the description of soil parameter in the modern soil mechanics. Practical exercises on the field vibration measurements and there evaluation will be performed. Design principles for foundations and buildings in earthquake affected regions are treated, further modelling and methods of analysis for special geotechnical structures under seismic loads taking into account effects of soil-structure interaction.

Leistungsnachweis

Klausur oder mündliche Prüfung

Geographical Information Systems (GIS) and building stock survey

Hazard projects and advanced geotechnologies

Examination "Hazard projects and advanced geotechnologies"

J. Schwarz

Prüfung

Fr, wöch., 09:00 - 12:00, Marienstraße 13 C - Hörsaal C, 25.07.2014 - 25.07.2014

Hazard projects and advanced geotechnologies

J. Schwarz

Projekt

Veranst. SWS: 4

Di, Einzel, 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, 29.04.2014 - 29.04.2014

Di, Einzel, 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, 29.04.2014 - 29.04.2014

Di, Einzel, 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, 29.04.2014 - 29.04.2014

Mo, wöch., 15:15 - 18:30, Marienstraße 7 B - Seminarraum 205

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

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

Life-lines engineering

Primary hazards and risks

Disastermanagement and mitigation strategies

Stochastics and risk assessment

Examination "Stochastics and Risk Assessment - Mathematical simulation"

T. Lahmer

Prüfung

Mo, Einzel, 09:30 - 11:00, Marienstraße 7 B - Seminarraum 005, 28.07.2014 - 28.07.2014

Examination "Stochastics and Risk Assessment - Part: Signal Analysis"**K. Markwardt**

Prüfung

Mi, Einzel, 10:00 - 11:00, Marienstraße 7 B - Seminarraum 005, 23.07.2014 - 23.07.2014

Structural engineering**Elective compulsory modules****Advanced Modeling - Calculation****K. Gürlebeck, D. Legatiuk**

Veranst. SWS: 6

Vorlesung

Di, wöch., 09:15 - 12:30, Coudraystraße 13 B - Seminarraum 208, ab 15.04.2014

Di, Einzel, 11:00 - 12:30, 13.05.2014 - 13.05.2014

Mo, wöch., 09:15 - 10:45, Marienstraße 7 B - Projektraum 301

Di, wöch., 09:15 - 12:30, Marienstraße 7 B - Seminarraum 205

Bemerkung

Ex.ad.req.: Project report

Kommentar

Scientifically orientated education in mathematics and computer science in view of a complex interdisciplinary and networked field of work and research, modeling and numerical simulation.

Numerical and analytical solution of partial differential equations, finite difference methods, numerical description of heat flow, wave propagation and elastostatic problems by finite difference methods tools: Maple, MATLAB, Java

Voraussetzungen

Advanced Training Course

Leistungsnachweis

1 exam (written or oral)

Examination "Modelling of structures and numerical simulation"**F. Werner**

Prüfung

Mi, Einzel, 09:00 - 11:00, Marienstraße 7 B - Seminarraum 205, 30.07.2014 - 30.07.2014

Mi, Einzel, 09:00 - 11:00, Marienstraße 7 B - Seminarraum 206, 30.07.2014 - 30.07.2014

Examination "Nonlinear analysis of structures under extreme loading"

H. Timmler

Prüfung

Fr, Einzel, 09:00 - 11:00, Marienstraße 7 B - Seminarraum 205, 01.08.2014 - 01.08.2014

Examination "Secondary hazards and risks"

K. Witt

Prüfung

Fr, Einzel, 09:00 - 11:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, 18.07.2014 - 18.07.2014

Experimental Structural Dynamics

V. Zabel

Projekt

Mo, wöch., 11:00 - 15:00, Marienstraße 7 B - Projektraum 301

Veranst. SWS: 4

Bemerkung

14 students NHRE only

Kommentar

The course conveys skills that are necessary for an experimental analysis of the dynamic properties of a structure. This includes the theory of modal models and frequency response functions, theoretical background of signal processing and modal parameter extraction techniques. The major aspects concerning dynamic measurements such as excitation, types of sensors and their application as well as time and frequency functions are discussed. Practical exercises using modern measurement systems are part of the course. The students will also be introduced to the development of virtual instruments using the graphical programming environment LabVIEW for both data acquisition and signal analysis.

Voraussetzungen

Structural dynamics

Leistungsnachweis

Project report, presentation

Modelling of structures and numerical simulation

F. Werner

Vorlesung

Mi, wöch., 11:00 - 15:00, Marienstraße 7 B - Seminarraum 205

Veranst. SWS: 4

Kommentar

· numerische Näherungsverfahren zur Lösung von Differentialgleichungssystemen für Probleme der Strukturmechanik (Finite Differenzen, FEM, BEM, netzfreie Methoden): Anforderungen an Interpolationsfunktionen; Polynom- und Splineansätze; Kontrollmöglichkeiten für den Diskretisierungsfehler (Fehlerschätzer); Locking-Probleme; gemischte Elementformulierungen · Optimierungsverfahren basierend auf Gradienten, Quasi-Newton-Verfahren, Stochastische Optimierungsverfahren und genetische Algorithmen, Numerische Bestimmung von statistischen Kenngrößen und Wahrscheinlichkeiten, Monte-Carlo-Methode in der Strukturmechanik · Grundlagen

der Systemidentifizierung-Geomechanische Anwendungen, geometrisch und konstitutive nicht lineare Ansätze, Besonderheiten numerischer Simulationen bei der Lösung von Anfangsrandwertproblemen in der Geotechnik, Simulation von Bauabläufen am Beispiel von Baugruben und Tunneln

Leistungsnachweis

Klausur oder mündliche Prüfung

Risk assessment and stochastic modeling in geotechnical and structural engineering

T. Lahmer

Veranst. SWS: 4

Integrierte Vorlesung

Block, Risk problems: Hörsaal 2, C13A, 01.04.2014 - 13.05.2014

Fr, Einzel, 17:00 - 21:00, Marienstraße 7 B - Projektraum 301, 04.07.2014 - 04.07.2014

Sa, Einzel, 09:15 - 16:45, Marienstraße 7 B - Projektraum 301, 05.07.2014 - 05.07.2014

Bemerkung

The lecture consists of three blocks which will be by the teachers:

Prof. Tom Lahmer (Bauhaus University Weimar),

Dr. Thomas Most (DYNARDO, Weimar)

Prof. Wuttke (Christian-Albrechts-Universität zu Kiel)

Please indicate your interest in the course via an E-Mail to Mrs. Terber (marlies.terber@uni-weimar.de) by briefly citing the title of the lecture and providing your name until **April 4th 2014** as this will make the organization of rooms, course material, etc. much easier.

The dates when the blocks will take place will be announced by the middle of April.

Kommentar

Soils, rocks and materials like concrete are in the natural state among the most variable of all engineering materials. Engineers, in particular geo-technicians, 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 and stochastic modeling.

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
- reliability-based design
- structural safety
- Risk assessment and stochastic modeling in practice (soil parameter estimation, spatial soil variability, deformation problems, bearing capacities, conduction and diffusion problems, slope stabilities,...)

The lecture consists of three blocks which will be by the teachers:

Prof. Tom Lahmer (Bauhaus University Weimar),

Dr. Thomas Most (DYNARDO, Weimar)

Prof. Wuttke (Christian-Albrechts-Universität zu Kiel)

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The dates when the blocks will take place will be announced by the middle of April.

Voraussetzungen

Basic knowledge in probability theory

Leistungsnachweis

Klausur oder mündliche Prüfung