

Vorlesungsverzeichnis

M.Sc. Natural hazards and risk in structural engineering

Winter 2014/15

Stand 08.04.2015

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M.Sc. Natural hazards and risk in structural engineering**1st meeting NHRE / Faculty welcome****J. Schwarz, S. Beinersdorf, B. Bode**

Informationsveranstaltung

Do, Einzel, 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, 09.10.2014 - 09.10.2014

Advanced Training Course**K. Gürlebeck, D. Legatiuk**

Veranst. SWS: 4

Vorlesung

Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, 08.12.2014 --> HS 6, C9, ab 20.10.2014

Mo, Einzel, 09:15 - 10:45, Coudraystraße 9 A - Hörsaal 6, 08.12.2014 - 08.12.2014

Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Group A

Do, wöch., 15:00 - 16:45, Coudraystraße 13 D - Pool-Raum 010, Group B

Kommentar**Numerical Analysis - Computation**

analytical and numerical solution of ordinary differential equations, numerical analysis for systems of linear algebraic equations, direct and iterative solvers; tool: MATLAB

CAE

data structures, object oriented programming and numerical methods;

tool: Java

Voraussetzungen

B.Sc.

Leistungsnachweis

2 exams (written or oral)

Wahlpflichtmodul I**Wahlpflichtmodul II****Wahlpflichtmodul III****Earthquake engineering and structural design****Experimental structural evaluation and rehabilitation****Examination "Experimental structural evaluation and rehabilitation"****J. Hildebrand, J. Schwarz, K. Markwardt**

Prüfung

Do, wöch., 13:00 - 16:00, Marienstraße 13 C - Hörsaal C, 19.02.2015 - 19.02.2015

Experimental Structural Evaluation**J. Hildebrand, V. Zabel**

Veranst. SWS: 2

Vorlesung

Di, wöch., 13:30 - 15:00, Marienstraße 7 B - Seminarraum 205, ab 02.12.2014

Do, wöch., 09:15 - 10:45, Marienstraße 7 B - Seminarraum 102

Kommentar**Experimental Structural evaluation**

Testing facilities and technical equipment; demands on specimens and scaling requirements; arrangement of sensors, application of equivalent forces and ground motion in pseudostatic and dynamic testing; Load and displacement relationship for full-scale testing of structural elements (RC columns, masonry wall); damping devices, prediction of capacity curves and material properties and parameters; recalculation of model calibration

VoraussetzungenObligatory moduls of 1st and 2nd semester**Leistungsnachweis**

1 exam (written or oral)

Model testing for Rehabilitation**J. Schwarz**

Veranst. SWS: 2

Vorlesung

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

Kommentar**Model testing for rehabilitation**

Experimental investigation of retrofitting strategies on small scale structural models; testing of elements real scale, derivation of force-displacement relationships,

VoraussetzungenObligatory moduls of 1st and 2nd semester**Leistungsnachweis**

1 exam (written or oral)

Signal Processing and Interpretation**K. Markwardt**

Veranst. SWS: 1

Vorlesung

Mo, Einzel, 17:00 - 18:30, Marienstraße 13 C - Hörsaal D, Written test !!!, 01.12.2014 - 01.12.2014

Mo, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal D, bis 24.11.2014

Kommentar**Signal processing and interpretation**

Conditioning of experimental data, error analysis, analog and digital filters; Fast Wavelet-Transform, compression and denoising algorithms; tool: MATLAB

Voraussetzungen

Obligatory moduls of 1st and 2nd semester

Leistungsnachweis

1 exam (written or oral)

Finite element methods

Structural dynamics

2401003 Structural Dynamics / Baudynamik

C. Könke

Veranst. SWS: 6

Integrierte Vorlesung

Di, wöch., 09:15 - 10:45, Coudraystraße 13 B - Hörsaal 3

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

Mi, wöch., 09:15 - 12:30, Coudraystraße 13 B - Seminarraum 208

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

Kommentar

Dynamics: Single and multidegree-of-freedom systems, frequency response function, Impulse response function, Duhamel integral, step-by-step methods, modal analysis, modal superposition, continuous systems, applications;

Baudynamik: Ein- und Zweifreiheitsgradsystem, Frequenzgangfunktion, Impulsreaktionsfunktion, Duhamel-Integral, Zeitschrittverfahren, Modalanalyse, modale Superposition, kontinuierliche Systeme, Anwendung.

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis

Klausur oder mündliche Prüfung

Geo- and hydrotechnical engineering

Examination "Soil mechanics" (Modul: Geo- and hydrotechnical Eng.)

K. Witt

Prüfung

Fr, Einzel, 09:00 - 11:00, Marienstraße 7 B - Seminarraum 205, 27.02.2015 - 27.02.2015

Geographical Information Systems (GIS) and building stock survey

Geographical information systems (GIS) and building stock survey

W. Schwarz, J. Schwarz

Veranst. SWS: 4

Integrierte Vorlesung

Di, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal A, ab 21.10.2014

Di, Einzel, 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, 04.11.2014 - 04.11.2014

Mo, Einzel, 15:15 - 18:30, Coudraystraße 13 A - Hörsaal 2, 02.02.2015 - 02.02.2015

Mo, wöch., 15:15 - 16:45, Marienstraße 7 B - Projektraum 301

Mo, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301

Leistungsnachweis

Project report + oral presentation

Hazard projects and advanced geotechnologies**Life-lines engineering****2310013 Life-lines engineering****G. Morgenthal, C. Könke**

Veranst. SWS: 4

Integrierte Vorlesung

Fr, wöch., 09:15 - 16:45, Marienstraße 7 B - Projektraum 301

Fr, wöch., 09:15 - 16:45, Marienstraße 7 B - Seminarraum 205

Kommentar

Design and construction of bridges in earthquake endangered regions, seismic design philosophies for bridges, specifics of seismic loads on bridges, possibilities and application of seismic isolation, experimental results, consideration of a simply supported bridge with different mechanical characteristics on a real earthquake record

Leistungsnachweis

Klausur oder mündliche Prüfung

Examination "Life-lines engineering"**G. Morgenthal**

Prüfung

Mo, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 106, 16.02.2015 - 16.02.2015

Mo, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 205, 16.02.2015 - 16.02.2015

Mo, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 206, 16.02.2015 - 16.02.2015

Primary hazards and risks**Examination "Primary hazards and risks (part: "Seismic monitoring")****J. Schwarz**

Prüfung

Fr, Einzel, 09:00 - 12:00, Marienstraße 13 C - Hörsaal D, 13.02.2015 - 13.02.2015

Examination "Primary hazards and risks (part: "Wind risk mitigation")

Prüfung

Di, Einzel, 10:00 - 11:30, Marienstraße 13 C - Hörsaal A, 31.03.2015 - 31.03.2015

Primary hazards and risks - Seismic Monitoring / Regional Ground Motion Prediction and database /

J. Schwarz

Veranst. SWS: 4

Integrierte Vorlesung

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

Kommentar

Seismic Monitoring

measurements for site response evaluation; description of seismic action; recording instruments and input models for seismic hazard assessment; EQ-Action for building design; Building Monitoring Systems: tasks and developments, review of database

Regional Ground Motion Prediction and database

Identification of Primary input hazard parameters; Ground Motion Prediction Models (GMPM) for different study area; elaboration of ground motion data and records; Application of ground motions models and tools to the study area; re-interpretation of national code background; tool: MATLAB

Leistungsnachweis

1 exam (written or oral - weighting acc. to credit points)

Primary hazards and risks - Wind Risk Mitigation in Structural Engineering

J. Schwarz

Veranst. SWS: 2

Integrierte Vorlesung

Mo, Einzel, 10:00 - 17:00, Marienstraße 13 C - Hörsaal D, 23.03.2015 - 23.03.2015

Di, Einzel, 09:00 - 17:00, Marienstraße 13 C - Hörsaal D, 24.03.2015 - 24.03.2015

Mi, Einzel, 09:00 - 17:00, Marienstraße 13 C - Hörsaal D, 25.03.2015 - 25.03.2015

Do, Einzel, 09:00 - 17:00, Marienstraße 13 C - Hörsaal D, 26.03.2015 - 26.03.2015

Fr, Einzel, 09:00 - 13:00, Marienstraße 13 C - Hörsaal D, 27.03.2015 - 27.03.2015

Kommentar

Wind Risk Mitigation in Structural Engineering

meteorology, stochastic wind effects including aeroelasticity, extreme value analysis; risk chain, storm tracks with high damage accumulation, hazard maps; basics of wind resistant design and environmental planning, wind tunnel technology, monitoring and simulations, risk control (control of exposition, shelter projects, wind effects at new types of infrastructures), examples and applications

Leistungsnachweis

1 exam (written or oral - weighting acc. to credit points)

Disastermanagement and mitigation strategies

1724309 Urban Disaster

F. Eckardt

Veranst. SWS: 2

Seminar

Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal C, 20.10.2014 - 02.02.2015

Kommentar

Cities have become the place for the most disastrous catastrophes. Destruction comes from a wide range of phenomena like earthquake, hurricanes, volcanoes, Tsunamis and others. It seems inevitable that these "natural hazards" are hitting cities even more in the future as the climate change develops its consequences. While engineering seeks for technical options for adaptation and mitigation, the main subject will be how people can develop new social practices in their daily life to survive, recapture and prevent damages of their lives. These questions are not easily to be answered and require a more profound understanding of urban life. This can only be achieved if these catastrophes are regarded in its societal context. This seminar wants to inform about a sociological perspective on natural catastrophes in cities. Its main assumption is that natural hazards only become a human disaster under certain circumstances. It will present recent approaches from sociology to understand more on the causes, effects and long lasting impacts of disasters in general. Looking back on different case studies, the seminar aims at providing a broader understanding of the context, framing, experience, reaction and recovery of disasters. Particular attention will be paid to the #post-disaster communities, the way people organize themselves during and after the disaster.

Richtet sich an: IPP, Urban Heritage, MA Urbanistik, MA European Urban Studies, MA Advanced Urbanism, MA Architektur, MA NHRE (Fak. B.)

Termine: montags 11:00 bis 12:30 Uhr, erster Termin 20. Oktober 2014

Belvederer Allee 5, room 008

Registration Belvederer Allee 5, room 003, 13.10.2014 – 30.10.2014

Disaster Management

H. Bargstädt

Veranst. SWS: 3

Integrierte Vorlesung

Mo, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205, ab 27.10.2014

Fr, Einzel, 14:30 - 19:30, Marienstraße 13 C - Hörsaal A, 16.01.2015 - 16.01.2015

Sa, Einzel, 09:15 - 15:00, Marienstraße 13 C - Hörsaal C, 17.01.2015 - 17.01.2015

So, Einzel, 09:15 - 15:00, Marienstraße 13 C - Hörsaal C, 18.01.2015 - 18.01.2015

Bemerkung

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

Part "Mitigation strategies" --> see lecture "The Sociology of Risk"

Kommentar

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 (theoretical and on the basis practical examples)

Consolidate of knowledge in handling a project management soft-ware

Additional: Lecture of "The Sociology of Risk"

Leistungsnachweis

Klausur oder mündliche Prüfung

Examination "Project- and Disastermanagement"

H. Bargstädt, B. Bode

Prüfung

Di, Einzel, 13:00 - 15:00, Marienstraße 13 C - Hörsaal A, 24.02.2015 - 24.02.2015

Stochastics and risk assessment

Examination "Stochastics and risk assessment (part: "Signal analysis")

K. Gürlebeck, K. Markwardt

Prüfung

Mi, Einzel, 10:00 - 11:00, Marienstraße 13 C - Hörsaal A, 18.02.2015 - 18.02.2015

Examination "Stochastics and risk assessment (part: "Simulation/Risk problems")

T. Lahmer

Prüfung

Mo, Einzel, 09:00 - 11:00, Coudraystraße 13 A - Hörsaal 2, 23.02.2015 - 23.02.2015

Stochastics and Risk Assessment - Mathematical simulation / Risk problems

T. Lahmer, K. Müller

Veranst. SWS: 4

Vorlesung

Mo, wöch., 13:30 - 15:00, Coudraystraße 13 B - Hörsaal 3, Risk problems: Hörsaal 6, C9A, 13.10.2014 - 24.11.2014

Di, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Risk problems: Hörsaal 2, C13A, 14.10.2014 - 25.11.2014

Mo, wöch., 13:30 - 15:00, Coudraystraße 13 A - Hörsaal 2, ab 01.12.2014

Di, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Mathematical simulation, ab 02.12.2014

Di, wöch., 17:00 - 18:30, Coudraystraße 13 A - Hörsaal 2, ab 02.12.2014

Do, Einzel, 13:30 - 15:00, Coudraystraße 13 A - Hörsaal 2, 11.12.2014 - 11.12.2014

Kommentar

Introduction to probability theory: Random events, discrete and continuous random variables; Descriptive statistics: parameters of one- and twodimensional samples, graphical representation of samples; Exploratory statistics: statistical tests and parameter estimation; Reliability theory: extreme value distributions; stochastic modeling with software tools like Matlab, Octave, Excel or R.

Characteristics and classification of random functions, which are necessary for risk analysis; catastrophic events and risk problems; hazard / risk / safety / reliability / damage / cost and fuzzy models; life time consideration; analysis by logic trees and charts (fault trees, event trees, cause/consequence charts, decision trees); risk assessment and risk acceptance.

Leistungsnachweis

Klausur oder mündliche Prüfung

Stochastics and Risk Assessment - Signal Analysis

K. Markwardt

Veranst. SWS: 2

Vorlesung

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

Leistungsnachweis

Klausur oder mündliche Prüfung

Structural engineering

Examination "Structural Engineering"

G. Morgenthal

Prüfung

Do, Einzel, 09:00 - 12:00, Marienstraße 7 B - Seminarraum 005, 26.02.2015 - 26.02.2015

Elective compulsory modules

Advanced Modeling – CAE

K. Gürlebeck, D. Legatiuk

Veranst. SWS: 4

Vorlesung

Mo, wöch., 13:30 - 15:00, Coudraystraße 13 A - Seminarraum 115

Di, wöch., 09:15 - 10:45, Coudraystraße 13 A - Seminarraum 115

Kommentar

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.

Konvergenz, Stabilität und Fehlerbetrachtung der Finiten-Differenz-Methode (FDM),

Modellierung stationärer und instationärer Wärmeleitprobleme

Konzepte der objekt-orientierten Programmierung: Modellbildung (UML), abstrakte Klassen und Methoden, Interfaces

Entwurf und Entwicklung eines Framework für Anwendungsentwicklung nach der Methode der Finiten Elemente (FEM)

Anwendungsentwicklung auf Basis des FEM-Framework

Voraussetzungen

FEM + Struct. Dyn., Adv. Mod.-Calc.

Programming in Java

Leistungsnachweis

1 exam (written or oral)

Examination "Modelling of structures and numerical simulation"

F. Werner

Prüfung

Mi, Einzel, 13:00 - 15:00, Marienstraße 7 B - Seminarraum 205, 11.02.2015 - 11.02.2015

Examination "Secondary hazards and risks"

K. Witt

Prüfung

Fr, Einzel, 13:00 - 15:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, 13.02.2015 - 13.02.2015

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

K. Smarsly, E. Tauscher, J. Wagner

Integrierte Vorlesung

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

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 15, 2014 (9:15am), Coudraystr. 13D, Orion-Pool.

Kommentar

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.

Voraussetzungen

Object-oriented modeling and Java programming language.

Leistungsnachweis

Oral examination and written paper.

Risk projects and evaluation of structures

J. Schwarz

Integrierte Vorlesung

Veranst. SWS: 4

Do, Einzel, 13:30 - 16:45, Marienstraße 13 C - Hörsaal C, 16.10.2014 - 16.10.2014

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

Kommentar

Risk mitigation projects

German TaskForce for Earthquake and lessons from recent missions; reinterpretation of case studies for different building types; evaluation of damaged structures, basics of tagging; Rehabilitation strategies and applied reconstruction techniques; design concepts; regional seismic risk assessment projects; damage scenarios, and loss prediction; results from Global Earthquake Model (GEM)

Evaluation and Re-Design of structures

Empirical and analytical vulnerability assessment for representatives of typical building types; identification of structural, non structural and structural affecting systems; replacement and up-grading of existing systems, performance- and scenario-based evaluation of structural damage; definition of critical conditions for simplified approaches; modeling and analysis of strengthened systems.

training in calculation tools Perform3D / 3Muri

Voraussetzungen

B.Sc.

Primary Hazards and risks; Earthquake engineering and structural design/ GIS

Leistungsnachweis

1 exam (written or oral)

Secondary Hazards and Risks (land-use, site studies)

K. Witt, F. Wuttke

Veranst. SWS: 4

Integrierte Vorlesung

Sa, Einzel, 09:00 - 18:30, Marienstraße 7 B - Projektraum 301, 06.12.2014 - 06.12.2014

Sa, Einzel, 09:00 - 18:30, Marienstraße 7 B - Projektraum 301, 10.01.2015 - 10.01.2015

Mo, wöch., 09:15 - 10:45, Coudraystraße 11 C - Seminarraum/Hörsaal 001, 5 dates -> see message board

Kommentar

Mass Movements: Classification, Landslides in Soil & Rock, Landslide hazards, Slope-Stability- Analysis, Slope Monitoring & Investigation, Slope Control, Stabilization; Problem Soils: Quick clays, Expansive and Collapsible soils

Geotechnical Earthquake Engineering: Assessment of Liquefaction potential, Amplification studies and site effects & topography, Seismic bearing capacity, Seismic design of retaining walls & Seismic earth pressure

Voraussetzungen

Geo- and hydrotechnical Engineering (Soil Mechanics)

Leistungsnachweis

1 exam (written or oral)