Vorlesungsverzeichnis

English-taught courses of the Faculty

Winter 2022/23

Stand 23.03.2023

English-taught courses of the Faculty

2202001 Seismic Monitoring / Regional Ground Motion

J. Schwarz, L. Abrahamczyk, C. Kaufmann, S. Beinersdorf Veranst. SWS: 4
Integrierte Vorlesung

1-Gruppe Mo, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, ab 17.10.2022
2-Gruppe Di, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, ab 18.10.2022
3-Gruppe Di, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, ab 18.10.2022
4-Gruppe Mo, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302, Seismic monitoring, ab 17.10.2022
Do, Einzel, 15:15 - 16:45, Marienstraße 13 C - Hörsaal D, 26.01.2023 - 26.01.2023
Do, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D
Do, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal D

Beschreibung

Seismic Monitoring:

Description of seismic action; recording instruments, input parameters for seismic hazard assessment; EQ-Action for building design; Measurements for site response evaluation; Building Monitoring Systems: tasks and developments, analysis of instrumental data; identification of dynamic and structural parameters

Regional Ground Motion:

Identification of hazard describing parameters; seismic networks, availability/ elaboration of ground motion data and records; Ground Motion Prediction Equations (GMPEs); application of ground motions models and tools to the study area and target site; re-interpretation of national code background; site categorization and response studies.

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis

1 Project report

”Regional Ground Motion” (17%) / **WiSe**

2 written exams

”Seismic Monitoring” / 180 min (50%) / **WiSe** + SuSe

”Wind Engineering” / 90 min (33%) / **WiSe** + SuSe

2204017 Wind Engineering

G. Morgenthal, I. Kavrakov, S. Beinersdorf Veranst. SWS: 2
Integrierte Vorlesung

Mo, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal D, , 27.02.2023 - 27.02.2023
Di, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal D, 28.02.2023 - 28.02.2023
Mi, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal D, 01.03.2023 - 01.03.2023
Do, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal D, 02.03.2023 - 02.03.2023
Fr, Einzel, 09:00 - 12:30, Marienstraße 13 C - Hörsaal D, 03.03.2023 - 03.03.2023
Fr, wöch., 09:00 - 12:30, dates by arrangement; Please see the announcements by Prof. Morgenthal LH D

Beschreibung

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 Project report

”Regional Ground Motion” (17%) / **WiSe**

2 written exams

”Seismic Monitoring” / 180 min (50%) / **WiSe** + SuSe

”Wind Engineering” / 90 min (33%) / **WiSe** + SuSe

2204019 Life-lines engineering (Lecture)

G. Morgenthal, S. Chawdhury, G. Tondo, I. Kavrakov Veranst. SWS: 4
Integrierte Vorlesung
Do, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal C, Seminarroom 1+2 Weimarhalle / Digital via BBB

Beschreibung

The students will be familiar with bridges in the context of their functions as critical infrastructure. They will be familiar with the design objectives with specific emphasis on risks associated with natural hazards and with strategies to limit damage and to ensure operability after a major natural disaster. They will be able to develop structural concepts and to carry out detailed design of such structures, including the application of relevant codes of practice.

Life-lines Engineering

History of bridge engineering; types of bridges; structural concepts and articulation; planning and design; construction methods; structural modelling and analysis; elastic and plastic design approaches; performance-based design; structural detailing; dynamic characteristics and behaviour under dynamic loading; seismic response and isolation; response to wind loading

Training in:

Structural modelling and Finite Element Analysis; design of post-tensioning systems in bridges; design and detailing of girders and piers; seismic response; wind response, analysis of cable stayed bridges

Leistungsnachweis

1 written exam

”Life-lines Engineering ”/ 180 min (100%) / **WiSe** + SuSe

2901005 Project- and Disaster Management

H. Bargstädt, B. Bode Veranst. SWS: 2
Integrierte Vorlesung
Fr, Einzel, 15:15 - 16:45, Marienstraße 13 C - Hörsaal B, 16.12.2022 - 16.12.2022
Fr, Einzel, 13:30 - 16:45, Coudraystraße 13 B - Hörsaal 3, 13.01.2023 - 13.01.2023
Fr, Einzel, 15:15 - 16:45, Marienstraße 13 C - Hörsaal B, 13.01.2023 - 13.01.2023
Fr, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal B
Fr, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal B

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 "Sociology of disaster"

Bemerkung

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

Part "Mitigation strategies" --> see lecture "Sociology of disaster"

Leistungsnachweis

1 written exam

”Project and disaster management ”/ 120 min

(50%) / **WiSe** + SuSe

1 Presentation + presentation paper

”Urban Sociology” (50%) / **WiSe**

2904002 Geographical information systems (GIS) and building stock survey (Lecture)

V. Rodehorst Veranst. SWS: 1

Integrierte Vorlesung

Di, Einzel, 15:15 - 16:45, Marienstraße 13 C - Hörsaal A, 11.10.2022 - 11.10.2022
Di, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal A, ab 18.10.2022

Beschreibung

Students will be trained to reproduce existing natural hazard and risk related data in GIS format using GIS Software Solutions and Tools, will be able to create basic layers for hazard and risk assessment and to establish relevant links and to solve simple example tasks. Students will be trained in building stock survey, vulnerability assessment, damage interpretation and handling of tools for detailed empirical and instrumental elaboration. Training in instruments, equipment, and technologies for advanced detailed building survey (geodetic, photogrammetric, satellite data).

Content:

Fundamentals of three-dimensional positioning, photogrammetry, GIS/cartography, land management / cadastre; earthwork computation; spatial data in daily life; instruments, equipment, and technologies for advanced detailed building survey (geodetic, photogrammetric, satellite data).

Bemerkung

Zum Bestehen des Moduls und der Anrechnung von 6 CP ist die Teilnahme an Vorlesung und des zugeordneten Seminars notwendig. Prüfungsleistung wird in Form eines Projektbeleges und einer Zwischenabgabe erbracht.

In order to pass the module and to reach the credits of 6 CP the participation in lectures and the assigned seminar is necessary. Examination is in form of a Project report and an intermediate submission.

Voraussetzungen

Prüfungsleistung wird in Form eines Projektbeleges und Präsentation erbracht.

Examination is in form of a Project report and presentation.

Leistungsnachweis

1 written exam

”Geographical Information Systems (GIS) and building stock survey” / 90 min (50%) / **WiSe** + SuSe

1 written report

”Geographical Information Systems (GIS) and building stock survey” (50%) / **WiSe**

901033 Sociology of disaster

J. Melzner, R. Podlaszewska, H. Bargstädt, S. Beinersdorf, B. Bode Veranst. SWS: 2

Integrierte Vorlesung
Mo, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal C, Digital (BBB)

engl. Beschreibung

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

Part "Mitigation strategies" --> see lecture "Urban Sociology"

Leistungsnachweis

1 written exam (digitial)

”Project and disaster management ”/ 120 min

(50%) / **WiSe** + SuSe

1 Project report (digital)

”Urban Sociology” (50%) / **WiSe**

2202005 Risk projects and evaluation of structures

L. Abrahamczyk, J. Schwarz, S. Beinersdorf, H. Maiwald, A. Uzair Veranst. SWS: 5

Vorlesung
Do, wöch., 09:15 - 12:30, Marienstraße 7 B - Seminarraum 205
Do, wöch., 09:15 - 12:30, Marienstraße 7 B - Projektraum 301

Beschreibung

Students will be familiar with the different risk elements in disaster mitigation studies. Students will be able to apply methods and current state in natural hazard and risk assessment integrating research and practical applications to urban settlements or structure-specific risk analysis and planning decisions. Students will be familiar with different analysis methods, knowledge-based techniques, and tools of empirical and analytical vulnerability assessment. Students will be familiar with the existing building typologies and be able to evaluate the quality of structural systems, to interpret the performance under horizontal action. Students are encouraged to contribute reports of regionally particular building types to World Housing Encyclopedia and NHRE database.

Risk evaluation for buildings and urban settlements (L)

Lessons from recent events and field missions; assessment of hazard phenomena; reinterpretation of observed response for different
building types; building taxonomies; knowledge-based exposure modelling; empirical and analytical vulnerability assessment; damage
classification and fragility functions; social risk modelling; decision support systems for OEF, EEW and RRE; building assessment criteria for
existing and new building stock.

Response estimate for disastrous events (E, P)
Training in risk scenarios: elaboration of input data for the target area (home countries), generation of shake maps; elaboration of fragility
functions; generation of risk scenarios and application of decision support system; simulation of mitigation measures.

Studies on Recent Natural Hazard Events (P)
Description and assessment of hazard phenomena; affected regions; building types; reinterpretation of observed damages for different
building types; conclusions from rapid response actions; initiated/necessary mitigation measures (consequences of the event); recent
developments in design and construction.

Voraussetzungen

B.Sc.

Seismic Monitoring / Earthquake Engineering

Leistungsnachweis

1 written exam ”Risk projects and evaluation of structures”
90 min (50%) / **WiSe** + SuSe

1 Project presentation (oral) ”Response estimate for disastrous and recent events”
(50%) / **WiSe**

2205014 Design and interpretation of experiments: Experiments in Structural Engineering

M. Kraus, S. Ibañez Sánchez, S. Mämpel Veranst. SWS: 2
Integrierte Vorlesung
Di, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal D, Experiments in structural engineering

Beschreibung

Students will be familiar with following: Design and setup as well as evaluation and interpretation of experimental testing in structural engineering. Provision of techniques linking experimental and mathematical / numerical modelling. Parallel assessment of steps being part of any verification and validation procedure. Discussion of common techniques of optimal experimental designs

Bemerkung

The course gives an overview on experiments and their evaluation regarding different tasks and scopes of structural engineering. Next to different testing techniques applied for diverse aims, the equipment and measuring devices employed for testing are treated as well.

Besides the experiment itself, it is an important question, how we can use the experimental data for the calibration and validation of models in engineering. In this course, we give insights to techniques called parameter and system identification.

As often signals are not useable directly, transforms are necessary, like filtering, Fourier Transform, Wavelet Transform and, in particular for signals with noise, averaging techniques. Having models at hand, the experiment can be designed virtually by means of nonlinear optimization.

Leistungsnachweis

1 written exam / 120 min / **WiSe** + SuSe including

”Experiments in Structural Engineering” and

”Signal Processing, Design of Experiments and System Identification”

2205014 Design and interpretation of experiments: Signal Processing, Design of Experiments and System Identification

T. Lahmer, F. Alkam, Z. Jaouadi Veranst. SWS: 2

Integrierte Vorlesung

1-Gruppe Mi, unger. Wo, 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Exercise
2-Gruppe Mi, gerade Wo, 09:15 - 10:45, Marienstraße 7 B - Projektraum 301, Exercise
3-Gruppe Mi, unger. Wo, 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
4-Gruppe Mi, gerade Wo, 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
Di, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal D, Signal Processing, Design of Experiments and System Identification

Beschreibung

Students will be familiar with following: Design and setup as well as evaluation and interpretation of experimental testing in structural engineering. Provision of techniques linking experimental and mathematical / numerical modelling. Parallel assessment of steps being part of any verification and validation procedure. Discussion of common techniques of optimal experimental designs

Bemerkung

The course gives an overview on experiments and their evaluation regarding different tasks and scopes of structural engineering. Next to different testing techniques applied for diverse aims, the equipment and measuring devices employed for testing are treated as well.

Besides the experiment itself, it is an important question, how we can use the experimental data for the calibration and validation of models in engineering. In this course, we give insights to techniques called parameter and system identification.

As often signals are not useable directly, transforms are necessary, like filtering, Fourier Transform, Wavelet Transform and, in particular for signals with noise, averaging techniques. Having models at hand, the experiment can be designed virtually by means of nonlinear optimization.

Leistungsnachweis

1 written exam / 120 min / **WiSe** + SuSe including

”Experiments in Structural Engineering” and

”Signal Processing, Design of Experiments and System Identification”

2906016 Secondary Hazards and Risks (land-use, site studies)

P. Staubach, G. Aselmeyer, C. Rodríguez Lugo Veranst. SWS: 4

Integrierte Vorlesung

Mo, wöch., 13:30 - 15:00, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202, Digital (BBB)
Di, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2

Beschreibung

The objective of this module is focused on deepening the skills of the students to judge the risk of a landslide (secondary hazard) in a given sloping ground caused by a primary hazard (e.g. earthquake, heavy rainfall). The students learn advanced methods for the investigation and monitoring of possibly instable soil and rock masses. They deepen their knowledge with respect to different methods of slope stability analysis under static loading and seismic impact. The students are able to study slope stability by means of the finite element method. They know various methods of slope stabilization. They know and can apply basic methods of Geotechnical Earthquake Engineering. To fix the theoretical background the students have to apply the methods learned at given tasks within a project.

Bemerkung

Different methods of slope stability analysis in cases of static and seismic loading (pseudo-static method, Newmark sliding block analysis); Slope investigation and monitoring; Slope stabilization methods; Analysis of slope stability by means of the finite element method (including computer exercise with finite element program Plaxis); Seismic design of retaining structures; Ground response analysis; Stability of rock masses

Voraussetzungen

Geo- and hydrotechnical Engineering (Soil Mechanics)

Leistungsnachweis

1 Project report

”Secondary Hazards and Risks” (33%) / **WiSe**

1 written exam

„Secondary Hazards and Risks”/ 120 min (67%) / **WiSe** + SuSe

2202011 Assessment of structural performance (under extreme loading conditions)

J. Schwarz, L. Abrahamczyk, S. Beinersdorf, H. Maiwald, P. Hasan, A. Uzair Veranst. SWS: 6

Vorlesung

Mo, wöch., 15:15 - 16:45, Marienstraße 7 B - Seminarraum 205, Lecture
Di, wöch., 11:00 - 12:30, Marienstraße 7 B - Seminarraum 206, Exercise

Beschreibung

Students will be familiar with the existing building typologies, the methods of structural performance assessment and design rules for traditional and engineered building types. Students should be able to evaluate the quality of structural systems, to interpret the performance of masonry and steel structures under horizontal action, to derive appropriate models and to decide upon the applicability of
equivalent or simplified ones. Students will be informed about on-going research projects and recent code developments which are linked to the course topics and options for further graduation (master thesis). Training of student’s ability to apply methods and current state in natural hazard and risk assessment. Students will be able to apply modern software tools to transfer buildings into dynamic models and to evaluate the seismic response characteristics in dependence on design situation and performance directed concepts; they will be trained to identify failure mechanism and design defects, and to evaluate appropriateness of strengthening measures. Students will be familiar with different analysis methods, techniques, and tools of empirical and analytical vulnerability assessment.

Structural performance of traditional and engineered building types (L)
Reinterpretation of observed response for different building types; building taxonomies; empirical and analytical vulnerability assessment; damage classification and fragility functions; design principles and structural solutions for traditional (masonry) and engineered (steel) type structures, basic rules for non-engineered buildings (with locally available materials); building assessment criteria for strengthening;
evaluation of applied strengthening and rehabilitation measures.

Damage assessment of unreinforced masonry structures (E, P)
Search for typical building representatives of the target regions (home countries of the participants); derivation of structural layout and simplified models of representative building types; modelling and assessment of masonry structures applying equivalent frame approach; determination of characteristic building response parameters; determination of fragility function; risk scenario for a virtual city.

Leistungsnachweis

1 Project report: „Damage assessment of unreinforced masonry structures" (33%) / **WiSe**

1 written exam: „Assessment of structural performance (under extreme loading conditions)"/ 120 min (67%) / **WiSe** + SuSe

2202012 Experimental testing based on impact and resistance: wind, fire and earthquake

L. Abrahamczyk Veranst. SWS: 4
Vorlesung
Mi, wöch., 15:15 - 18:30, Marienstraße 7 B - Seminarraum 205

2204019 Life-lines engineering (Exercise)

G. Morgenthal, S. Chawdhury, G. Tondo, I. Kavrakov Veranst. SWS: 2
Seminar
1-Gruppe Do, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal B

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

Leistungsnachweis
Klausur oder mündliche Prüfung

2205032 Structural engineering – Reinforced and post-tensioned concrete structures (Exercise)

G. Morgenthal, S. Chawdhury, I. Kavrakov, S. Rau, C. Taube, G. Tondo Veranst. SWS: 1
Seminar
1-Gruppe Fr, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B) dates by arrangement
2-Gruppe Fr, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D) dates by arrangement

2205032 Structural engineering – Reinforced and post-tensioned concrete structures (Lecture)

G. Morgenthal, S. Chawdhury, I. Kavrakov, S. Rau, G. Tondo Veranst. SWS: 2
Vorlesung
Fr, wöch., 09:15 - 12:30, Marienstraße 13 C - Hörsaal D, dates by arrangement

Beschreibung

Structural Engineering – Standard systems:

History of structures; building materials; structural form and structural behavior; actions on structures; structural reliability and codes of practice; mechanical modelling of structures; design of reinforced concrete and steel structures

Leistungsnachweis

2 written exams

”Standard systems” / 90 min (50%) / **WiSe** + SuSe

”Advanced systems” / 90 min (50%) / **SuSe** + WiSe

2301012-1 Applied mathematics (Lecture)

B. Rüffer, N. Gorban Veranst. SWS: 2
Vorlesung
Mo, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal B, ab 10.10.2022

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 will be studied.

Leistungsnachweis

1 written exam

”Applied mathematics and stochastics for risk assessment” / 180 min (100%) / **WiSe** + SuSe

2301012-2 Applied mathematics (Exercise)

B. Rüffer, N. Gorban Veranst. SWS: 1
Seminar
1-Gruppe Fr, gerade Wo, 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, ab 21.10.2022
2-Gruppe Fr, unger. Wo, 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, ab 21.10.2022

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 will be studied.

Leistungsnachweis

1 written exam

”Applied mathematics and stochastics for risk assessment” / 180 min (100%) / **WiSe** + SuSe

2301012-2 Mathematics for risk management (MBM) - Exercices

T. Lahmer, N. Butler, S. Marwitz Veranst. SWS: 1
Übung
Fr, unger. Wo, 07:30 - 09:00, ab 14.10.2022

2301012-3 Stochastics for risk assessment (Lecture) / Mathematics for risk management (MBM)

T. Lahmer Veranst. SWS: 2
Vorlesung
Di, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal B, ab 11.10.2022

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

1 written exam

”Applied mathematics and stochastics for risk assessment” / 180 min (100%) / **WiSe** + SuSe

2301012-4 Stochastics for risk assessment / Mathematics for risk management (MBM) (Exercise)

T. Lahmer, N. Butler, Z. Jaouadi Veranst. SWS: 1
Seminar
1-Gruppe Fr, unger. Wo, 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Exercise for NHRE (Group 1) and DE, ab 21.10.2022
1-Gruppe Do, wöch., 15:15 - 16:45, Marienstraße 7 B - Seminarraum 205, Tutorium for NHRE (Group 1) and DE, ab 24.11.2022
2-Gruppe Fr, gerade Wo, 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Exercise for NHRE (Group 2), ab 21.10.2022
2-Gruppe Do, wöch., 15:15 - 16:45, Marienstraße 7 B - Seminarraum 105, Tutorium for NHRE (Group 2) and DE, ab 24.11.2022

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

1 written exam

”Applied mathematics and stochastics for risk assessment” / 180 min (100%) / **WiSe** + SuSe

2401011 Applied Structural Dynamics (Exercise)

V. Zabel, F. Tartaglione Garcia Veranst. SWS: 1

Seminar

1-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium Group A, ab 06.12.2022
1-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B), ab 08.12.2022
2-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium Group B, ab 06.12.2022
2-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D), ab 08.12.2022
3-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium Group C, ab 07.12.2022
4-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium Group D, ab 07.12.2022

Bemerkung

- Complementary to the lectures

2401011 Applied Structural Dynamics (Lecture)

V. Zabel Veranst. SWS: 2

Vorlesung

Di, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, ab 06.12.2022
Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, ab 07.12.2022

Beschreibung

- Machinery induced vibrations
- Earthquake excitation
- Wind induced vibrations
- Human induced vibrations

2401014 Structural Dynamics (Exercise)

V. Zabel, M. Ansari Veranst. SWS: 1

Seminar

1-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium - Group A, bis 29.11.2022
1-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B), bis 01.12.2022
2-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium - Group B, bis 29.11.2022
2-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D), bis 01.12.2022
3-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium - Group C, bis 30.11.2022
4-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium - Group D, bis 30.11.2022

Bemerkung

- Complementary to the lectures

2401014 Structural Dynamics (Lecture)

V. Zabel Veranst. SWS: 2

Vorlesung

Di, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, bis 29.11.2022
Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, bis 30.11.2022

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: Duhamel integral, central difference and Newmark methods;

- MDOF systems: modal analysis, modal superposition, modal damping, Rayleigh damping, Frequency response functions

- Continuous systems

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis

1 written exam: „Fundamentals of structural dynamics”/ 90 min (50%)

2401015 Finite element methods (Exercise)

T. Rabczuk, M. Bianco, J. Lopez Zermeño Veranst. SWS: 1

Seminar

1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205, Tutorium - Group A
1-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B)
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 206, Tutorium - Group B
2-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D)
3-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205, Tutorium - Group C
4-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 206, Tutorium - Group D

2401015 Finite element methods (Lecture)

T. Rabczuk

Vorlesung

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

Beschreibung

Finite element methods: (50% of semester course time)

strong and weak form of equilibrium equations in structural mechanics, Ritz and Galerkin principles, shape functions for 1D, 2D, 3D elements, stiffness matrix, numerical integration, Characteristics of stiffness matrices, solution methods for linear equation systems, post-processing and error estimates, defects of displacements based formulation, mixed finite element approaches,

Voraussetzungen

Bachelor Civil Engineering

Leistungsnachweis

1 written exam: „Fundamentals of finite element methods”/ 90 min (50%)

2904002 Geographical information systems (GIS) and building stock survey (Exercise/Project)

J. Schwarz, S. Beinersdorf, P. Hasan, H. Maiwald Veranst. SWS: 3

Seminar

1-Gruppe Mo, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal B, ab 24.10.2022
2-Gruppe Di, wöch., 13:30 - 15:15, Marienstraße 13 C - Hörsaal B, ab 25.10.2022
Mo, Einzel, 13:30 - 15:00, Marienstraße 13 C - Hörsaal B, 10.10.2022 - 10.10.2022

Beschreibung

Training in:

Coordinate systems; global maps for the natural hazard phenomena; quality and availability of input data; layers for natural hazard related parameters (topography, geology, and subsoil); reproduction of historical events and associated parameters; layers for risk assessment and loss estimation procedures; link between layers and risk mapping procedures. In parallel, necessary foundations in scientific working are taught and trained.

Bemerkung

We will start at 24.10.2022 with the exercises.

Leistungsnachweis

1 written exam

”Geographical Information Systems (GIS) and building stock survey” / 90 min (50%) / **WiSe** + SuSe

1 written report

”Geographical Information Systems (GIS) and building stock survey” (50%) / **WiSe**

303005 Object-oriented Modeling and Programming in Engineering

C. Koch, M. Artus Veranst. SWS: 4

Vorlesung

Do, wöch., 15:15 - 16:45, Coudraystraße 9 A - Hörsaal 6, Lecture, ab 13.10.2022
Fr, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Lab class, ab 14.10.2022
Fr, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Lab class, ab 14.10.2022
Do, Einzel, 10:00 - 12:00, Coudraystraße 9 A - Hörsaal 6, written exam, 23.02.2023 - 23.02.2023

Beschreibung

Objektorientierte Modellierung und Programmierung für Ingenieure

In diesem Modul wird fundamentales Wissen vermittelt, um objektorientierte Softwarelösungen für Ingenieuraufgaben zu konzipieren und zu implementieren. Dies beinhaltet Fähigkeiten zur Analyse von Ingenieurproblemen, um entsprechende objektorientierte Modelle zu erzeugen und geeignete Algorithmen auszuwählen. Die verwendete Programmiersprache ist Java. Da die Basiskonzepte allgemeingültig beschrieben werden, werden die Studierenden in die Lage versetzt, auch andere modernen Programmiersprachen zu einzusetzen.

Inhalte:

- Kontrollstrukturen (alternatives, loops, sequences)
- Grundlegende Datenstrukturen und Algorithmen
- Prinzipien der objektorientierten Softwareentwicklung (Datenkapselung, Vererbung, Polymorphie)
- Unified Modeling Language als Werkzeug für Softwareentwurf und –dokumentation
- Entwicklung grafischer Nutzerschnittstellen mithilfe des Model-View-Controller-Entwurfsmusters

engl. Beschreibung

Object-oriented Modeling and Programming in Engineering

This module covers the basic knowledge needed to develop and implement object-oriented software solutions for engineering problems. This includes the ability to analyse an engineering problem, so that corresponding object-oriented models can be created and suitable algorithms can be selected. The programming language used in this module is Java. However, the since fundamental concepts are described in general, students will be able to program in other modern programming languages.

Content:

- Essential programming constructs (alternatives, loops, sequences)
- Fundamental data structures and algorithms
- Principles of object oriented software development (encapsulation, inheritance and polymorphism)
- The Unified Modeling Language as a tool for software design and documentation

Development of graphical user interfaces using the Model-View-Controller pattern

Leistungsnachweis

schriftliche Klausur

902058 AEC Global Teamwork Seminar: High Performance Digital Built Environment, Integrated Project Delivery, and the Future of Work in a Connected World

G. Morgenthal, T. Beckers, B. Bode Veranst. SWS: 2

Seminar

Block, 17:00 - 20:00, Online - The link will be posted on the Moodle page., 24.10.2022 - 28.10.2022

Beschreibung

Lecturer:

Prof. Dr. Renate Fruchter
Director of the Project Based Learning Laboratory (PBL Lab)
Stanford University, USA

Seminar objectives:

The seminar prepares students to work in multi-disciplinary, collaborative, geographically distributed learning and working environment in the architecture, engineering and construction (AEC) sector. Therefore, opportunities and challenges around the topic of global teamwork will be introduced by the lecturer and the students will learn about emergent collaboration technologies and workplaces. In addition, it will be discussed which high performing skills need to be obtained to succeed in this learning and working environment.

Contents:

- Overview of integrated research and education at PBL lab at Stanford University
- P5BL: Problem-, Project-, Product-, Process-, People-Based Learning / Work
- Past project experience as strategic resources

- Relationship between architects, structural engineers, mechanical, electrical and plumbing engineers, construction managers and life cycle financial managers in multidisciplinary projects
- Case study examples emergent technologies in virtual design and construction
- Hands on experience with different collaboration tools
- Teamwork
- Final presentations of group mini project assignment and feedback

Leistungsnachweis

The grade will be based on participation during the seminar and on the final presentation.

903006 Infrastructure planning in developing countries

E. Kraft, T. Haupt, T. Schmitz Veranst. SWS: 2

Integrierte Vorlesung

Mi, wöch., 09:15 - 10:45, Coudraystraße 11 C - Seminarraum/Hörsaal 001

Beschreibung

The course increases the knowledge and understanding for differing cultural and economic circumstances or boundary conditions when planning new infrastructure solutions in an international context. Students will learn how to identify structural problems and adapt technical solutions to local settings. Special attention is directed on the ability to balance the economic feasibility versus the ecological necessity of a project when developing new infrastructural solutions. Altogether the course provides insight into environmental, economic as well as socio-cultural conditions and prerequisites in non-industrialized societies. Suitable technical solutions specifically developed for local requirements are being presented and investigated. Special focus is laid on:

- Planning processes,
- Waste amounts and composition,
- Waste management organization,
- Refinancing models,
- Socio-economic setting,
- Working in developing countries,
- Technical solutions for the collection, transport and treatment of waste streams,
- Innovative and/or low cost sanitation systems,
- Treatment and reuse of black, brown, yellow, grey and rainwater.

Leistungsnachweis

Written exam and voucher

911002 Valuation Real Estate

T. Beckers, T. Vogl, B. Bode Veranst. SWS: 2

Integrierte Vorlesung

Mo, Einzel, 15:15 - 20:15, Coudraystraße 11 C - Seminarraum/Hörsaal 001, Block A (Schluer) on site, 17.10.2022 - 17.10.2022
Di, Einzel, 07:30 - 09:00, Coudraystraße 11 C - Seminarraum/Hörsaal 001, Block A (Schluer) on site, 18.10.2022 - 18.10.2022
Mo, Einzel, 15:30 - 16:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001, Opening Exam on site, 21.11.2022 - 21.11.2022
Block, Coaching (Schluer) ViCo with each group, 22.11.2022 - 25.11.2022
Mo, Einzel, 15:15 - 18:30, Block B (Schluer) Webinar, 28.11.2022 - 28.11.2022
Di, Einzel, 07:30 - 10:45, Block B (Schluer) Webinar, 29.11.2022 - 29.11.2022
Block, Coaching/Review (Schluer) ViCo with each group, 16.01.2023 - 20.01.2023
Mo, Einzel, 15:15 - 18:30, Block C (Schluer) Webinar, 23.01.2023 - 23.01.2023
Di, Einzel, 07:30 - 10:45, Block C (Schluer) Webinar, 24.01.2023 - 24.01.2023

Beschreibung

The value of real estate is more than just a monetary dimension of assets. In fact, the valuation of real estate helps to take sustainable business decisions and to increase the value of real estate portfolios. Therefore, the students will not only get to know the basic methods of real estate valuation according to national and international standards, they will also develop, how to transfer that knowledge into possible actions of real estate management.

The students:

- learn basic concepts and methods of Real Estate Valuation,
- become acquainted with important German and international valuation methods and the difference between them,
- deepen valuation knowledge through further intense self-studying,
- develop their own valuation tools supported by calculation programs such as Microsoft Excel
- fundamentally understand and derive superordinate conclusions for real estate management,
- process real life cases and develop recommendations,
- learn how to approach and solve complex cases in interdisciplinary groups,
- practice working under time pressure and according to defined milestones and deadlines
- practice effective team communication, cooperation and coordination,

Bemerkung

Dozentin / Lecturer:

Janine Schluer

Leistungsnachweis

Opening exam (1 h)

Case preparation and presentations

911012 Tax Issues in Built Environments

T. Beckers, T. Vogl, B. Bode Veranst. SWS: 2

Seminar

Di, Einzel, 09:15 - 12:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001, Erste Session Präsenz !!!, 25.10.2022 - 25.10.2022
Di, Einzel, 09:15 - 12:30, Zweite Session Webinar, 08.11.2022 - 08.11.2022
Di, Einzel, 09:15 - 12:30, Dritte Session Webinar, 22.11.2022 - 22.11.2022
Di, Einzel, 09:15 - 12:30, 06.12.2022 - 06.12.2022
Di, Einzel, 09:15 - 12:30, Vierte Session Webinar, 13.12.2022 - 13.12.2022
Di, Einzel, 09:15 - 12:30, Fünftee Session Webinar, 10.01.2023 - 10.01.2023
Di, Einzel, 09:15 - 12:30, Sechste Session Webinar, 17.01.2023 - 17.01.2023
Di, Einzel, 09:15 - 12:30, Siebte und finale Session Webinar, 31.01.2023 - 31.01.2023

Beschreibung

Anhand eines systematischen Grundverständnisses des (internationalen) Steuerrechts werden die Studierenden in die Lage versetzt, u.a. folgende Fragestellungen zu erkennen und eine Lösung herbeizuführen:

• Steuerlich haben Immobilien verschiedenartige, teils sehr komplexe Bezüge; Immobilien können ertrag- und umsatzsteuerlich, je nach Nutzungsart und Mieter in den einzelnen Gebäudeteilen, unterschiedliche Sphären haben,

• Ausländische Immobilien, die aufgrund von Doppelbesteuerungsabkommen (DBA) hinsichtlich der Mieteinkünfte steuerfrei gestellt sind, können dennoch als sog. Zählobjekte einen inländischen gewerblichen Grundstückshandel auslösen,[AKD1]

• Der Schwerpunkt der Lehrveranstaltung liegt auf der Immobilienbesteuerung in der Praxis. Ergänzend werden Grundlagen des internationalen Steuerrechts mit DBA und Außensteuerrecht sowie des Investmentsteuerrechts angesprochen,

Grundzüge des deutschen bzw. internationalen Steuerrechts (Ertragssteuern und Verkehrssteuern; internationales Steuerrecht: Grundlagen DBA, Außensteuerrecht; Investmentsteuerrecht).

Das vermittelte Wissen und die erlernten Kompetenzen sind nicht nur für Immobilien- / Immobilien- / Facility-Manager wichtig oder allgemein Wirtschaftsinteressierte nützlich, sondern auch für Architekten, Bauingenieure, Stadtplaner, private Immobilienbesitzer und alle, die mit Entscheidungen in Bezug auf die gebaute Umwelt konfrontiert sind.

engl. Beschreibung

Based on a systematic basic understanding of (international) tax law the students will be enabled, among other items, to recognize the following fields of questions and come to solutions:

- With regard to taxes real estate has various, in part very complex references; real estate can touch upon different domains of income tax and VAT tax treatment, depending on the kinds of use and tenants in the individual parts of the property,
- Foreign-located real estate, which concerning rental income can be exempted from taxation on the basis of Double Taxation Treaties (DTT), can still trigger domestic trade tax consequences in the context of a commercial property transaction as so-called countable objects.
- The focus of the seminar is on real estate taxation in practice. In addition, basic elements of international tax law including DTT, foreign tax law; as well as investment tax will be touched upon.

Basics of German and international tax laws (income taxes and transfer taxes; international tax las: basis of DTT, foreign tax law, investment tax).
The knowledge conveyed and the competencies acquired are relevant not only for real estate- / facility managers or generally those interested in business, but also for architects, civil engineers, urban planners, private real estate owners and generally all those who are confronted with decisions in regard to the built environment.

Bemerkung

Dozent(in)/Lecturers:

RA/StB Prof. Dr. Johann Knollmann/

RA Carina Koll (Pricewaterhouse-Coopers GmbH)

Max. 24 Teilnehmer, Online-Einschreibung über Moodle

Leistungsnachweis

1 Hausarbeit – wahlweise auf Englisch oder Deutsch

1 Essay/term paper – optionally in English or German