Vorlesungsverzeichnis

English-taught courses of the Faculty

Winter 2021/22

Stand 23.05.2022

English-taught courses of the Faculty 3

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., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302, Group I - Regional ground motion The grouping will be arranged individually as announced in the lecture., ab 18.10.2021
1-Gruppe Di, wöch., 13:30 - 15:00, Coudraystraße 13 B - Pool Fak. B 007, Group III - Regional ground motion The grouping will be arranged individually as announced in the lecture., ab 19.10.2021
3-Gruppe Mo, wöch., 15:15 - 16:45, Marienstraße 7 B - Projektraum 301, Group C - Regional ground motion The grouping will be arranged individually as announced in the lecture., ab 18.10.2021
Do, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal B, Seismic monitoring

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

2202005	Risk projects and evaluation of structures

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

Do, wöch., 09:15 - 12:30, Coudraystraße 13 B - Hörsaal 3
Do, wöch., 09:15 - 12:30, Coudraystraße 13 B - Pool Fak. B 007

Beschreibung

Training of student's ability to apply methods and current state in natural hazard and risk assessment integrating research and practical applications to site- or structure-specific risk analysis and planning decisions.

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. Students are encouraged to contribute reports of regionally particular building types to World Housing Encyclopedia and NHRE database.

Bemerkung

Lessons from recent events and field missions; assessment of hazard phenomena; reinterpretation of observed response for different building types; recent developments in design and construction; performance assessment of masonry, steel and wooden structures as well as interaction effects between structure and soil, equipment and filling media; damage classification and fragility functions; building assessment criteria for strengthening; evaluation of applied strengthening and rehabilitation measures.

Training in:

Modelling and assessment of masonry structures applying equivalent frame approach; determination of characteristic building response parameters; determination of fragility function.

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)

"Risk projects" (25%) / **WiSe**

Project reports (written short paper)

"Evaluation of structures" (25%) / **WiSe**

2202011	Assessment of structural performance (under extreme loading conditions)

J. Schwarz, L. Abrahamczyk, S. Beinersdorf, H. Maiwald, P. Hasan, A. Uzair
Vorlesung
Mo, wöch., 15:15 - 16:45, Coudraystraße 13 B - Hörsaal 3, Lecture
Di, wöch., 11:00 - 12:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001, Exercise

Veranst. SWS: 6

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. Examples of different small to large scale testing and the instrumentation requirements are elaborated to provide structure related parameters and characteristic force-displacement relationships in support of analytical studies and the re-interpretation of damage patterns. 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).

Bemerkung

Structural performance of traditional and engineered building types (L)

Examples of small and larger scale testing; facilities and technical equipment; demands on specimens and scaling requirements; application of equivalent forces and ground motion in pseudo-static and dynamic testing; load and displacement relationship for full-scale testing of structural elements and building configurations; prediction of capacity curves and material properties and parameters; design principles and structural solutions for traditional (masonry) and engineered (steel) type structures, basic rules for non-engineered buildings (with locally available materials).

Elaboration of structural models for performance assessment of existing buildings (P)

Search for typical building representatives of the target regions (home countries of the participants); experimental investigation of design and retrofitting strategies using small-scale structural models; testing of elements and interpretation of failure mechanisms, derivation of structural layout and simplified models of representative building types, damage prognosis and comparison with observed response; fragility functions; introduction in data processing for simulation tools, a.o.3MURI

Small Scale testing (E)

For the target masonry building of the project, a representative small scale model has to be developed following the scaling requirements as well the demands and limitations on specimens and size of testing platform. A real model for testing has to prepared using a set of small stone units and wooden elements. The model will be shaken using existing facilities. [Note: The realization and final testing depend on the pandemic situation.]

Leistungsnachweis

1 Project report

„Elaboration of structural models for performance assessment of existing buildings and their small-scale testing" (33%) / **WiSe**

1 written exam

„Assessment of structural performance (under extreme loading conditions)"/ 180 min (67%) / **WiSe** + SuSe

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2204017	Wind Engineering

G. Morgenthal, I. Kavrakov, S. Beinersdorf   Veranst. SWS: 2
Integrierte Vorlesung
Mo, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal B,   , 28.02.2022 - 28.02.2022
Di, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal B, 01.03.2022 - 01.03.2022
Mi, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal B, 02.03.2022 - 02.03.2022
Do, Einzel, 09:00 - 16:45, Marienstraße 13 C - Hörsaal B, 03.03.2022 - 03.03.2022
Fr, Einzel, 09:00 - 12:30, Marienstraße 13 C - Hörsaal B, 04.03.2022 - 04.03.2022

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 (Exercise)

G. Morgenthal, S. Chawdhury, I. Kavrakov Veranst. SWS: 2
Seminar
1-Gruppe Do, wöch., 17:00 - 18:30, Coudraystraße 13 A - Hörsaal 2, Group 1 (Group A + Group B)
1-Gruppe Do, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 302, Group 1 (Group A + Group B)
2-Gruppe Do, wöch., 17:00 - 18:30, Coudraystraße 13 B - Hörsaal 3, Group 2 (Group C + Group D) LH D + Digital via BBB
2-Gruppe Do, wöch., 17:00 - 18:30, Coudraystraße 13 B - Pool Fak. B 007, Group 2 (Group C + Group D) LH D + Digital via BBB

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 seismic isolation, experimental results, consideration of a simply supported bridge with different mechanical characerics on a real earthquake record

Leistungsnachweis
Klausur oder mündliche Prüfung

2204019	Life-lines engineering (Lecture)

G. Morgenthal, S. Chawdhury, I. Kavrakov Veranst. SWS: 4
Integrierte Vorlesung
Do, wöch., 13:30 - 16:45, Coudraystraße 13 A - Hörsaal 2, 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

2205012	Structural engineering – Standard systems (Lecture)

G. Morgenthal, S. Rau, S. Chawdhury, I. Kavrakov Veranst. SWS: 2

Vorlesung
Fr, wöch., 09:15 - 12:30, Marienstraße 13 C - Hörsaal D, dates by arrangement

Beschreibung

<u>Structural Engineering – Standard systems:</u>

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

2205012	Structural enginering – Standard systems (Exercise)

G. Morgenthal, S. Rau, C. Taube, S. Chawdhury, I. Kavrakov   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

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, Coudraystraße 13 B - Hörsaal 3, 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
Integrierte Vorlesung

Veranst. SWS: 2

1-Gruppe Di, gerade Wo, 17:00 - 18:30, Coudraystraße 13 A - Hörsaal 2, Signal Processing, Design of Experiments and System Identification (Exercise)
1-Gruppe Di, gerade Wo, 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, Signal Processing, Design of Experiments and System Identification (Exercise)
1-Gruppe Di, gerade Wo, 17:00 - 18:30, Coudraystraße 13 B - Pool Fak. B 007, Signal Processing, Design of Experiments and System Identification (Exercise)
2-Gruppe Di, unger. Wo, 17:00 - 18:30, Coudraystraße 13 A - Hörsaal 2, Signal Processing, Design of Experiments and System Identification (Exercise)
2-Gruppe Di, unger. Wo, 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, Signal Processing, Design of Experiments and System Identification (Exercise)
2-Gruppe Di, unger. Wo, 17:00 - 18:30, Coudraystraße 13 B - Pool Fak. B 007, Signal Processing, Design of Experiments and System Identification (Exercise)
Di, wöch., 15:15 - 16:45, Coudraystraße 9 A - Hörsaal 6, 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"

2301012-1	Applied mathematics (Lecture)

S. Bock, A. Legatiuk, K. Gürlebeck
Vorlesung

Veranst. SWS: 2

Di, wöch., 17:00 - 18:30, Coudraystraße 13 B - Hörsaal 3, Digital (Main), ab 12.10.2021

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 in MAPLE will be studied. :

Leistungsnachweis

1 written exam

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

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

T. Lahmer, N. Butler, S. Marwitz
Übung
Fr, unger. Wo, 07:30 - 09:00, ab 15.10.2021

Veranst. SWS: 1

2301012-2	Stochastics for risk assessment (Lecture) / Mathematics for risk management (MBM)

T. Lahmer
Vorlesung

Veranst. SWS: 2

1-Gruppe Fr, wöch., 07:30 - 09:00, Coudraystraße 13 B - Seminarraum 208, Tutorium for NHRE (Group 1) and DE
2-Gruppe Fr, wöch., 07:30 - 09:00, Coudraystraße 11 A - Seminarraum 214, Tutorium for NHRE (Group 2)
Di, wöch., 11:00 - 13:30, Coudraystraße 13 B - Seminarraum 210, Prof. Lahmer Lecture in combination with BBB (digital) If LH 3 is complete, please use this room for hybrid lectures as well., ab 12.10.2021
Di, wöch., 11:00 - 13:30, Coudraystraße 13 A - Hörsaal 2, Prof. Lahmer Lecture in combination with BBB (digital), ab 12.10.2021

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

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2401011	Applied Structural Dynamics (Exercise)

V. Zabel, F. Tartaglione Garcia
Seminar

Veranst. SWS: 1

1-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 A - Hörsaal 2, Tutorium Group A, ab 07.12.2021
1-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B) Digtial until further notice!, ab 09.12.2021
2-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium Group B, ab 07.12.2021
2-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D) Digtial until further notice!, ab 09.12.2021
3-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Tutorium Group C, ab 08.12.2021
4-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium Group D, ab 08.12.2021

Bemerkung

- Complementary to the lectures

| 2401011 | Applied Structural Dynamics (Lecture) |

V. Zabel
Veranst. SWS: 2
Vorlesung

Di, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Digtial until further notice!, ab 07.12.2021
Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal B, Digtial until further notice!, ab 08.12.2021

Beschreibung

- Machinery induced vibrations

- Earthquake excitation

- Wind induced vibrations

- Human induced vibrations

| 2401012 | Applied Finite element methods (Exercise) |

T. Rabczuk, M. Bianco, A. Habtemariam, J. Lopez
Zermeňo, F. Tartaglione Garcia
Veranst. SWS: 1
Seminar

1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Tutorium Group A, ab 08.12.2021
1-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B), ab 09.12.2021
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium Group B, ab 08.12.2021
2-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D), ab 09.12.2021
3-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 B - Hörsaal 3, Tutorium Group C, ab 07.12.2021
4-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 B - Pool Fak. B 007, Tutorium Group D, ab 07.12.2021

| 2401012 | Applied Finite element methods (Lecture) |

T. Rabczuk, C. Könke
Veranst. SWS: 2
Vorlesung

Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal B, ab 08.12.2021
Do, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, ab 09.12.2021

| 2401014 | Structural Dynamics (Exercise) |

V. Zabel, A. Habtemariam
Veranst. SWS: 1
Seminar

1-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 B - Pool Fak. B 007, Tutorium - Group A, bis 30.11.2021
1-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B), bis 02.12.2021
2-Gruppe Di, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium - Group B, bis 30.11.2021
2-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal C, Group 2 (Group C + Group D), bis 02.12.2021
3-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Tutorium - Group C, bis 01.12.2021
4-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Tutorium - Group D, bis 01.12.2021

Bemerkung

- Complementary to the lectures

2401014   Structural Dynamics (Lecture)

V. Zabel   Veranst. SWS: 2
Vorlesung
Di, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, bis 30.11.2021
Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal B, bis 01.12.2021

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, A. Habtemariam, J. Lopez   Veranst. SWS: 1
Zermeño, F. Tartaglione Garcia
Seminar
1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Tutorium - Group A, bis 01.12.2021
1-Gruppe Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Group 1 (Group A + Group B), bis 02.12.2021
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Tutorium - Group B, bis 01.12.2021
2-Gruppe Do, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal C, Group B (Group C + Group D), bis 02.12.2021
3-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 B - Hörsaal 3, Tutorium - Group C, bis 30.11.2021
4-Gruppe Di, wöch., 07:30 - 09:00, Coudraystraße 13 A - Hörsaal 2, Tutorium - Group D, bis 30.11.2021

2401015   Finite element methods (Lecture)

T. Rabczuk
Vorlesung
Mi, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal B, bis 01.12.2021
Do, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, bis 02.12.2021

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%)

2901005   Project- and Disaster Management

H. Bargstädt, B. Bode   Veranst. SWS: 3
Integrierte Vorlesung
Fr, wöch., 11:00 - 12:30, BBB - Online, 26.11.2021 - 03.12.2021
Fr, Einzel, 15:15 - 18:30, Marienstraße 13 C - Hörsaal A, 21.01.2022 - 21.01.2022
Sa, Einzel, 09:15 - 15:00, Marienstraße 13 C - Hörsaal A, 22.01.2022 - 22.01.2022
So, Einzel, 09:00 - 12:30, Marienstraße 13 C - Hörsaal A, 23.01.2022 - 23.01.2022
Fr, wöch., 11:00 - 12:30, Steubenstraße 6, Haus F - Hörsaal K20, Hybrid (Präsenz + Online)

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

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 (Exercise/Project)

J. Schwarz, S. Beinersdorf, P. Hasan, H. Maiwald   Veranst. SWS: 3
Seminar
1-Gruppe Mo, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal B, Group A, ab 11.10.2021
2-Gruppe Mo, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal B, Group B, ab 18.10.2021

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.

Bemerkung

We will start at 19.10.2021with a lecture (all groups).

Leistungsnachweis

1 intermediate evaluation + written report

"Geographical Information Systems (GIS) and building stock survey" (100%) / **WiSe**

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

V. Rodehorst   Veranst. SWS: 1
Integrierte Vorlesung
Di, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2, Digital via BBB We will start at 18.10.2021, ab 12.10.2021

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).

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.

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 intermediate evaluation + written report

"Geographical Information Systems (GIS) and building stock survey" (100%) / **WiSe**

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

G. Morgenthal, T. Wichtmann, G. Aselmeyer   Veranst. SWS: 4
Integrierte Vorlesung
Mo, wöch., 13:30 - 15:00, Coudraystraße 13 B - Hörsaal 3, Digital (BBB)
Di, wöch., 09:15 - 10:45, Coudraystraße 11 C - Seminarraum/Hörsaal 001

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

2909020	**Macroscopic Transport Modelling**

C. Winkler, J. Uhlmann, U. Plank-Wiedenbeck, J. Bänsch   Veranst. SWS: 4
Integrierte Vorlesung
Di, wöch., 11:00 - 15:00, Marienstraße 7 B - Projektraum 302, 19.10.2021 - 01.02.2022

Beschreibung

Teil A: Grundlagen

Planerische Rahmenbedingungen, Raumstrukturdaten und Netzwerke, Methodik und Verfahren, Empirische Verkehrsdaten für Verkehrsmodellentwicklungen, Verkehrserzeugung, Verkehrsverteilung, Verkehrsmittelwahl,

Verkehrsumlegung, Stärken und Schwächen unterschiedlicher Modellansätze, Kalibrierung und Validierung, Prognosen- und Szenarioentwicklung

Teil B: Modellierung

Praktische Umsetzung und Anwendung, Modellierung eines Verkehrsnetzes und der Verkehrsnachfrage mit PTV VISUM, Praktische Anwendung der Theorie und kritische Betrachtung von Modellergebnissen, Präsentation der Studierenden in Gruppen

engl. Beschreibung

Part A: Principles

Transport planning framework, Methodology and procedures, Land-Use Data and networks, Empirical Travel Data for model developments, Trip generation, Trip distribution, Mode choice, Traffic assignment, Methods and algorithms, Strengths and weaknesses of different model approaches, Calibration and validation, Forecasting and scenario calculations

Part B: Model Development

Practical implementation and application, Modelling transport network and travel demand using PTV VISUM, Application of learned methodological approach(es) and critical reflection of the model outputs, Student presentation (group work)

Bemerkung

Beleg; Prüfungsvoraussetzung: Belegabgabe

Lehrformat WiSe 2021/22: Vorlesung digital, Übung hybrid

Voraussetzungen

Teilnehmeranzahl auf 15 begrenzt. Bestätigung der Professur Verkehrssystemplanung notwendig

Bewerbung bis 12.10.2021 ausschließlich per Mail an vsp@bauing.uni-weimar.de. Bitte kurz den fachlichen Hintergrund und die Motivation für die Kursteilnahme schildern.

Empfohlen: Vorkenntnisse in der Modellierung/ Simulation und Verkehrsplanung und-technik. **Sollten keine Vorkenntnisse im Bereich der Verkehrsplanung vorliegen muss der Kurs "Introduction to Mobility and Transport" parallel belegt werden!**

Leistungsnachweis

Teil A:

Klausur (120 Min), Englisch, 50%

Teil B:

Beleg und Präsentation, Englisch, 50%

Die Belegabgabe ist Vorraussetzung für die Klausurteilnahme

2909021	International Case Studies in Transportation

J. Uhlmann, M. Rünker, U. Plank-Wiedenbeck, P. Schmidt
Vorlesung

Veranst. SWS: 4

Mo, Einzel, 17:00 - 18:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001, 11.10.2021 - 11.10.2021
Mo, wöch., 17:00 - 18:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001, 18.10.2021 - 31.01.2022
Mo, wöch., 19:00 - 20:30, Coudraystraße 11 C - Seminarraum/Hörsaal 001

Beschreibung

Teil A: Wie können wir nachhaltige Mobilität gestalten und unsere Städte lebenswerter machen? Diese Antwort wird durch Präsentationen von internationalen Best-Practice Lösungen beantwortet. Gastdozenten stellen Planungsprozesse aus dem internationalen Bereich mit Schwerpunkt Urbane Räume vor. In einem wöchentlichen Begleitseminar werden die Themen und ihre Übertragbarkeit diskutiert.

Teil B: Exkursion in eine Europäische Stadt (z.B. Fahrradstadt Kopenhagen, Hafen City Hamburg, DLR Berlin u.a.). Informationen werden noch bekanntgegeben.
Die Kosten für die Exkursion müssen von den Teilnehmern

Auf Grund der COVID-19-Pandemie wird im Wintersemester 2021/22 keine Exkursion angeboten.

Bemerkung

Ringvorlesung in Kooperation mit der Fachhochschule Erfurt, Institut Verkehr und Raum

Die Gastvorträge finden montags von 19:00-20:30 statt. Die Termine werden noch bekannt gegeben.

Das Seminar findet ab dem 18.10 wöchtentlich als Präsenzveranstaltung statt. Die Teilnehmendenzahl ist daher auf 15 begrenzt

Informationsveranstaltung am 11.10. um 17:00.

Voraussetzungen

Teilnehmeranzahl auf 15 begrenzt. Bewerbung bis 13.10.2021 um 23:59 Uhr ausschließlich per EMail an vsp@bauing.uni-weimar.de (maximal eine Seite A4)

Number of participants limited to 15. Please apply until 13.10.2021 23:59 only via Email to vsp@bauing.uni-weimar.de (maximum one page A4)

Leistungsnachweis

Digitales Poster und Pitch mit mündlicher Prüfung „International Case Studies" / (100%) / WiSe

303005	Object-oriented Modeling and Programming in Engineering

C. Koch, M. Artus   Veranst. SWS: 4
Vorlesung
Mo, wöch., 15:15 - 16:45, Lecture (online) Moodle Link:, ab 18.10.2021
Fr, wöch., 09:15 - 10:45, Lab class (online) Moodle Link:, ab 22.10.2021

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

401007	**Structural Engineering Models**

C. Könke, F. Tartaglione Garcia, C. Zacharias   Veranst. SWS: 4
Integrierte Vorlesung
Mi, Einzel, 09:00 - 11:00, exam, HS B, M 13C (along with "Computer Models for Physical Processes"), 23.02.2022 - 23.02.2022

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, 120 min duration

724415   Urban Sociology

H. Bargstädt, B. Bode, S. Beinersdorf   Veranst. SWS: 2
Integrierte Vorlesung
Mo, wöch., 17:00 - 18:30, Coudraystraße 13 B - Hörsaal 3, 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**

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

H. Bargstädt, A. Toschka, B. Bode   Veranst. SWS: 2
Seminar

Beschreibung

<u>**Lecturer:**</u>
Prof. Dr. Renate Fruchter
University Stanford University, USA

<u>**Seminar objectives:**</u>

- Introduce global teamwork opportunities and challenges, emergent collaboration technologies, workplaces, and high performance skills.
- To engage students in multi-disciplinary, collaborative, geographically distributed learning and working

<u>**Contents:**</u>

- Overview of integrated research and education at Project Based Learning Lab at Stanford University
- P5BL: Problem-, Project-, Product-, Process-, People-Based Learning / Work
- PBL Global Teamwork Ecosystem: people, places, collaboration applications, devices, network infrastructure

- Past project experience as strategic resources
- Relationship between architects, structural and MEP engineers, construction managers and LCFM 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

Bemerkung

Contact/ Registration:
Mr. Adrian Toschka, adrian.toschka@uni-weimar.de

Technology required:
ALL participants should have a good network connect and computer.
Collaboration software details – to be announced November 5.

Please enroll in the corresponding Moodle course to participate in the seminar and receive further information.

Voraussetzungen

Bachelor degree in Management, Civil Engineering, Architecture, others

Leistungsnachweis

Evaluation of students and teams:
Active involvement, group work, presentation sessions

911002	Valuation Real Estate

H. Bargstädt, T. Vogl, B. Bode Veranst. SWS: 2
Integrierte Vorlesung

Mo, Einzel, 17:00 - 20:15, Block A (Schluer) Webinar, 11.10.2021 - 11.10.2021
Di, Einzel, 07:30 - 10:45, Block A (Schluer) Webinar, 12.10.2021 - 12.10.2021
Mo, Einzel, 17:00 - 18:30, Coudraystraße 13 A - Hörsaal 2, Opening Exam, 22.11.2021 - 22.11.2021
Di, Einzel, Coaching/Review (Schluer) ViCo with each group, 23.11.2021 - 23.11.2021
Mo, Einzel, 17:00 - 20:15, Block B (Schluer) Webinar, 29.11.2021 - 29.11.2021
Di, Einzel, 07:30 - 10:45, Block B (Schluer) Webinar, 30.11.2021 - 30.11.2021
Di, Einzel, Coaching/Review (Schluer) ViCo with each group, 04.01.2022 - 04.01.2022
Mo, Einzel, 17:00 - 20:15, Block C (Schluer) Webinar, 10.01.2022 - 10.01.2022
Di, Einzel, 07:30 - 10:45, Block C (Schluer) Webinar, 11.01.2022 - 11.01.2022

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,

Leistungsnachweis

Opening exam (1 h)

Case preparation and presentations

911012   Tax Issues in Built Environments

H. Bargstädt, T. Vogl, B. Bode   Veranst. SWS: 2
Seminar
Mo, Einzel, 17:00 - 20:15, Block A (Knollmann) Webinar, 01.11.2021 - 01.11.2021
Mo, Einzel, 17:00 - 20:15, Block A (Koll) Webinar, 08.11.2021 - 08.11.2021
Mo, Einzel, 17:00 - 20:15, Block A (Knollmann) Webinar, 15.11.2021 - 15.11.2021
Mo, Einzel, 17:00 - 20:15, Block B (Koll) Webinar, 06.12.2021 - 06.12.2021
Mo, Einzel, 17:00 - 20:15, Block B (Knollmann) Webinar, 13.12.2021 - 13.12.2021
Mo, Einzel, 17:00 - 20:15, Block C (Knollmann) Webinar, 24.01.2022 - 24.01.2022

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 in regard to 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- / 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

<u>Dozent(in)/Lecturers:</u>

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