

# **Vorlesungsverzeichnis**

English-taught courses of the Faculty

Sommer 2023

Stand 07.12.2023

**English-taught courses of the Faculty**

**3**

## English-taught courses of the Faculty

### 202002 Earthquake engineering and structural design (L + E + P)

**J. Schwarz, L. Abrahamczyk, C. Kaufmann, S. Beinersdorf** Verant. SWS: 6

Vorlesung

1-Gruppe Mo, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, NHRE - Group A+B

2-Gruppe Mo, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 302, NHRE - Group C+D

3-Gruppe Do, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 301, NHRE - Group B+C

4-Gruppe Do, wöch., 17:00 - 18:30, Marienstraße 7 B - Projektraum 302, NHRE - Group B+C

Mo, wöch., 17:00 - 18:30, Marienstraße 7 B - Seminarraum 205, NHRE - Group A+B

Do, wöch., 13:30 - 16:45, Marienstraße 13 C - Hörsaal D, Lecture

#### Beschreibung

Students are trained and qualified in tasks of earthquake engineering, natural hazard and risk determining parameters. Students will be able to process input data, to realize design decision for structures of different building type and risk potential, to apply modern building codes and design concepts, to develop earthquake resistant structures and to evaluate structural design.

#### Earthquake engineering

Seismic Code development and generations; simplified analysis methods; design of structures and regularity criteria for earthquake resistance; performance and experience-based design concepts; rules for engineered buildings (R/C, steel, masonry) and non-engineered buildings; interaction effects between structure and soil, equipment and filling media; special and high risk structures

#### Structures in Earthquake Regions

Description of National code development; recent code situation; determination of seismic forces for an idealized RC frame system; comparison of different international code levels

#### Design of RC frames with masonry infill walls in earthquake regions: Application of modern software tools

Training of modelling and calculation with different software tools; interpretation of structural systems in terms of earthquake resistance design (ERD); design and analysis of structural systems for given and modified building layouts; comparison of the results with outcome of damage surveys. Tools: ETABS, SAP2000

#### Voraussetzungen

recommended module "Primary Hazards and Risks" NHRE

#### Leistungsnachweis

##### 1 written exam

"Earthquake engineering" / 180 min (67%) / **SuSe** + WiSe

##### 1 Project report + Project presentation

"Structures in Earthquake Regions/Design of RC frames" /

(33%) / **SuSe**

### 202003 Geo- and hydrotechnical engineering - Part: "Flood hazard and vulnerability assessment" (L + E)

**H. Maiwald, S. Beinersdorf**

Verant. SWS: 3

**Vorlesung**

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

Do, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, Dates by arrangement

**Beschreibung**

The students should be able to apply the strategies and methods to arbitrary engineering problems in the given fields. To fix the theoretical background the student has to apply the methods independently at given tasks during several projects.

**Flood Hazard and Vulnerability Assessment**

Flood Management; Fundamentals of flood defence; Management of low-lying areas; Design of river dikes, channels and dams; Design concepts for the defence of structural objects and buildings; Forecasting, management and maintenance in flood defence; Hydrology, hydraulic calculations, flood routing; Characteristics of tsunami action, forces and loads on structures; Structural damage and loss prediction, damage scenarios; Re-interpretation of recent events.

**Bemerkung**

Vorlesungen in englischer Sprache "Flood hazard and vulnerability assessment"

**Leistungsnachweis****1 written exam**

"Flood Hazard and Vulnerability Assessment" / 90 min (50%)

/ **SuSe** + WiSe

<b>202004</b>	<b>Exam: Multi-hazard and risk assessment</b>
---------------	---

**J. Schwarz, S. Beinersdorf, H. Maiwald**

Prüfung

Do, Einzel, 09:00 - 10:30, Marienstraße 13 C - Hörsaal B, 27.07.2023 - 27.07.2023

**Beschreibung**

The students will be familiar with the probability of natural hazard and risk determining parameters. They will be able to recognize procedures of single and multi hazard assessment and to process input data and to apply tools to study areas. Students will be introduced in further advanced geotechnologies and existing or on-going research as well as global projects conducted by GFZ.

**Hazard Assessment and Applications**

Primary input and output parameters for EQ (and other natural) hazard; Earthquake statistics and occurrence probability; Methodology of seismic hazard assessment; Seismicity models; Examples of seismic hazard and risk studies; Synopses of natural hazards; procedures and developments in multi-hazard assessment; Case studies of multi-hazard, vulnerability and risk considerations.

**Workshop**

"Natural Hazards and Advanced Geotechnologies" --> due to the current situation, we will be not able to conduct the excursion - this part will be replaced by: Multi-hazard study of your home country and building stock survey

**Compilation of EQ hazard-related data**

Treatment of long term seismicity data files; elaboration of earthquake data to get harmonized input for PSHA; earthquake catalogues (for the countries of the participants and adjacent regions); data pre-processing; Hazard Description for the Project regions

Excursion to GeoResearchCenter Potsdam --> the recent situation might allow to have the excursion this year

### Bemerkung

In this course 28 students can take part. **It is compulsory for the DAAD-scholarship holders of NHRE intake 2021.** There will be an introduction to the module at April 4th, where everybody interested can participate.

If you are interested to take part in the course, please write a **proposal** why you are interested and what are the major problems in your country related to multi-hazard that you identified yourself. Please **submit this to silke.beinersdorf@uni-weimar.de until April 4th, 2022.** We will inform you about the decision until April 8th, 2022.

The excursion to Potsdam might take place this semester.

**As soon as you are accepted, you will be enrolled to the moodle-room.**

### Voraussetzungen

recommended module "Primary Hazards and Risks" (NHRE)

completion of the module "Geographical information systems (GIS) and building stock survey" (NHRE) or basic knowledge of GIS-Systems is also recommended

### Leistungsnachweis

#### 1 written exam

"Multi-Hazard and risk assessment" / 90 min

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

#### 1 Project report (SYMULTHAN)

(50%) / **SuSe**

## 202004 Multi-hazard and risk assessment (L + E)

**J. Schwarz, S. Beinersdorf, H. Maiwald, N. Hadidian  
Moghaddam, P. Hasan**

Veranst. SWS: 4

Vorlesung

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

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

### Beschreibung

The students will be familiar with the probability of natural hazard and risk determining parameters. They will be able to recognize procedures of single and multi-hazard assessment and to process input data and to apply tools to study areas. Students will be introduced in further advanced geotechnologies and existing or on-going research as well as global projects conducted by GFZ.

### Hazard Assessment and Applications

Primary input and output parameters for EQ (and other natural) hazard; Earthquake statistics and occurrence probability; Methodology of seismic hazard assessment; Seismicity models; Examples of seismic hazard and risk studies; Synopses of natural hazards; procedures and developments in multi-hazard assessment; Case studies of multi-hazard, vulnerability, and risk considerations.

### Workshop

"Natural Hazards and Advanced Geotechnologies"

### Compilation of EQ hazard-related data

Treatment of long-term seismicity data files; elaboration of earthquake data to get harmonized input for PSHA; earthquake catalogues; creation of shakemaps; data pre-processing; Hazard Description for the Project regions

-> Excursion to GeoResearchCenter Potsdam

### Bemerkung

In this course 28 students can take part. **It is compulsory for the DAAD-scholarship holders of NHRE intake 2022.** There will be an introduction to the module at April 4th, where everybody interested can participate.

If you are interested to take part in the course, please write a **proposal** why you are interested and what are the major problems in your country related to multi-hazard that you identified yourself. Please **submit this to silke.beinersdorf@uni-weimar.de until April 3rd, 2023.** We will inform you about the decision until April 7th, 2023.

The excursion to Potsdam will take place this semester. **As soon as you are accepted, you will be enrolled to the moodle-room.**

### Voraussetzungen

recommended module "Primary Hazards and Risks" (NHRE)

completion of the module "Geographical information systems (GIS) and building stock survey" (NHRE) or basic knowledge of GIS-Systems is also recommended

### Leistungsnachweis

#### 1 written exam

"Multi-Hazard and risk assessment" / 90 min

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

#### 1 Project report (SYMULTHAN)

(50%) / **SuSe**

## 204018 Structural parameter survey and evaluation (L + E + P)

**G. Morgenthal, V. Rodehorst, R. Illge, S. Rau, T. Gebhardt** Verant. SWS: 4.5

Vorlesung

Fr, wöch., 09:15 - 12:30, Marienstraße 13 C - Hörsaal D

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

### Beschreibung

The students will be familiar with methods to determine properties of structural systems by means of modern measurement techniques. They will be familiar with the concepts, the application and the limitations of these techniques. They understand the data obtained and the methods to condition, analyse and interpret the data to extract information about structures and structural members and components. They will be able to apply the concepts to develop measurement setups and analysis procedures to problems encountered in structural engineering.

### Signal Analysis

Trigonometric polynomials (TP); amplitude-phase and complex representation; approximation of arbitrary periodic functions by TP using method of least squares, calculation of Fourier coefficients and error estimation; Fourier series. Discussion of spectra and Fourier transform and its basic properties; Convolution and its properties and applications; random variables and central limit theorem; applications of Fourier transforms such as filtering of signals and solving differential equations

### Sensor-based Monitoring and System Analysis

Types and principles of sensors; important sensor properties; data acquisition techniques; spectral and stochastic analysis of sensor data; properties of structural systems important in experimental testing and structural health monitoring; relevant limit states; structural analysis, modelling and model calibration; applications to static and dynamic response, load determination, physically nonlinear structural behaviour and optimization of sensor system setups

### Geo-spatial Monitoring

Preparation and planning of three-dimensional measurement tasks; application of tacheometry, satellite-based positioning (GNSS), terrestrial laser scanning and photogrammetry for monitoring; image-based sensor orientation and surface reconstruction; spatial transformations, georeferencing, distance measures, pointcloud registration and geometric deformation analyses

### Voraussetzungen

Primary hazards and risks

Applied mathematics

### Leistungsnachweis

#### 1 written exam

"Structural parameter survey and evaluation" / 120 min

(100%) / **SuSe** + WiSe

## 205007 Modelling of steel structures and numerical simulation (L + E)

**M. Kraus, S. Ibañez Sánchez, S. Mämpel**

Veranst. SWS: 4

Vorlesung

1-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise

1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise

2-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Exercise

2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise

Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, Exercise

Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Exercise

### Beschreibung

The students will be familiar with skills and expertise in the field of nonlinear structural analyses. Extensive knowledge of theoretical basics and modern modelling methods including numerical representations are the aim of the course. The students will acquire skills in handling advanced tools for the analysis and the design of structures.

Design of steel structures using finite element methods; basics of the design; modelling of structures and loads; nonlinear material behaviour, numerical analyses of steel-members and structures regarding geometric and physical nonlinearities; stability behaviour of members including flexural and lateral torsional buckling

### Leistungsnachweis

#### 1 Project report

"Modelling of steel structures and numerical simulation" (0%) / **SuSe**

**1 written exam**

"Modelling of steel structures and numerical simulation" / 120 min (100%) / **SuSe + WiSe**

**205013, 205033 Structural engineering - Steel structures (L)**

**M. Kraus, S. Ibañez Sánchez**

Veranst. SWS: 3

Vorlesung

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

Di, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal D

**Beschreibung**

Students will be familiar with the history of structures and structural forms, with building materials and building methods. They will understand the concepts of structural engineering design, including safety concepts, loads and structural design codes. They will be able to convert a structural concept into a mechanical model to determine internal demand and to design and detail the components of the structure, with an emphasis on reinforced concrete and post-tensioned concrete structures as well as steel and steel-concrete composite structures.

**Structural Engineering – Advanced systems (summer semester):**

Design of steel and steel-concrete composite structures; Post-tensioned concrete structures – design and detailing; Design of steel connections and detailing

**Voraussetzungen**

B.Sc.

**Leistungsnachweis****2 written exams**

"Standard systems" / 90 min (50%) / **WiSe + SuSe** --> WiSe!

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

**2401012 Applied Finite element methods (Exercise)**

**T. Rabczuk, A. Habtemariam, J. Lopez Zermeño, F. Tartaglione Garcia**

Veranst. SWS: 1

Seminar

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

Mi, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, Tutorium

Mi, wöch., 13:30 - 15:00, Marienstraße 7 B - Seminarraum 205, Tutorium

Fr, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 105, Tutorium

**2401012 Applied Finite element methods (Lecture)**

**T. Rabczuk, C. Könke**

Veranst. SWS: 2

Vorlesung

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



## 301016 Complex dynamics

**B. Ruffer**

Veranst. SWS: 4

Vorlesung

Di, wöch., 09:15 - 12:30, Coudraystraße 13 B - Hörsaal 3, ab 09.05.2023

Di, wöch., 07:30 - 10:45, Coudraystraße 13 A - Hörsaal 2

### Beschreibung

After the course the students will be able to analyse mathematical models that describe dynamic behaviour, as they occur in engineering (e.g. mechanical coupling of building structures), in biology and in physics, but also in multi-agent systems in computer science, or as opinion dynamics in psychology. Based on examples from different disciplines, students learn to build simplified models that allow to answer questions on their long-term behaviour. Students will be able to apply methods of feedback design that help shape the dynamics of a given system, along with the relevant stability concepts. As several topics lend themselves for computer simulation, students of this course will develop a proficiency to both implement and analyse mathematical models using computational tools and software.

### Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

### Voraussetzungen

B.Sc., knowledge in Matlab or Python

### Leistungsnachweis

#### 1 written exam

"Complex dynamics"

120 min (100%) / **SuSe** + WiSe

## 301017 Mathematics for data science

**B. Ruffer, M. Schönlein**

Veranst. SWS: 4

Vorlesung

Mi, Einzel, 13:30 - 16:45, Coudraystraße 13 B - Hörsaal 3, 05.04.2023 - 05.04.2023

Mo, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

### Beschreibung

After the course the students will be familiar with the fundamental concepts of data science. The participants can analyse given data sets with respect to dimensionality reduction and clustering. They also know the basic structure of neural networks and support vector machines to solve classification tasks. The participants know relevant methods from linear algebra and optimization and can apply these techniques. This embraces the design of appropriate algorithms and the implementation of different numerical methods to solve the corresponding problems.

### Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

#### Voraussetzungen

B. Sc.; Analysis and Linear Algebra at Bachelor level, knowledge of Matlab or Python

#### Leistungsnachweis

##### 1 written exam

"Complex dynamics"

120 min (100%) / **SuSe** + WiSe

### 303001 Advanced Building Information Modelling

**C. Koch, M. Alabassy, J. Krischler**

Veranst. SWS: 4

Vorlesung

Mi, wöch., 11:00 - 12:30, Marienstraße 7 B - Student Design Studio – SDS 303, Exercise

Mi, wöch., 11:00 - 12:30, Coudraystraße 13 B - Pool Fak. B 007, Exercise

Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture

#### engl. Beschreibung

Advanced Building Information Modelling

Content: Advanced geometric and parametric modelling, Interoperability and collaboration concepts (IFC, IDM, BEP), Advanced use cases (e.g. clash detection, as-built model-ing), BIM programming (incl. visual programming)

Target qualifications: This module introduces advanced concepts of Building Information Modelling (BIM) to provide students with advanced knowledge in order to understand, analyze and discuss scientific research approaches related to BIM. Within the frame of the mod-ule project (coursework) the students will choose a topic from a pre-defined list or come up with their own topic. Based on that they will do detailed research, imple-ment a representative concept in a software prototype and discuss findings and limi-tations. Also the students acquire skills of scientific working and presentation.

#### Bemerkung

NHRE: Possible as Elective Compulsory as from Intake 2022

#### Voraussetzungen

Recommended require-ments for participation: Basic knowledge of Computer-Aided Design, BIM concepts, and object-oriented programming

#### Leistungsnachweis

written report, presentation

### 303002 Simulation Methods in Engineering

**C. Koch, M. Artus**

Veranst. SWS: 4

Vorlesung

Fr, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A  
 Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, Exercise  
 Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302

### engl. Beschreibung

Simulation Methods in Engineering

Content:

- System analysis and modelling
- System dynamics
- Discrete event simulation
- Multi-agent simulation
- Input data and stochastic simulation
- Simulation based optimization
- Introduction to the software AnyLogic

Target qualifications:

This module provides students with comprehensive knowledge about computer based simulation concepts to address practical challenges in engineering. Modern simulation and optimization software is introduced within tutorials. The module project (coursework) offers an opportunity to students to work in groups on current problems in the context of civil and environmental engineering (e.g. production logistics, pedestrian simulation, pollutant dispersion). Using object-oriented simulation software the students will analyze, model and simulate different engineering systems. The programming is carried out using Java. Also the students acquire team working and presentation skills.

### Voraussetzungen

Recommended requirements for participation: Basic knowledge of programming

### Leistungsnachweis

Short group report, group presentation, written exam

## 451002 Introduction to Optimization (L+E)

### T. Lahmer

Veranst. SWS: 3

Integrierte Vorlesung

Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Lecture

Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise Dates by arrangement

### Beschreibung

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

### Bemerkung

#### Introduction to Optimization (summer semester):

Definitions, Classification of Optimization Problems,

Linear Problems, Simplex Method, Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants. (Robust) Structural Optimization (including Shape and Topology Optimization)

**Voraussetzungen**

B.Sc.

**Leistungsnachweis****1 written or oral exam** (depending on the number of participants)"Introduction to Optimization" (3 credits) / **SuSe + WiSe****451006 Optimization in Applications (P)****T. Lahmer**

Projektmodul/Projekt

Veranst. SWS:

3

**Beschreibung**

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

**Bemerkung****Optimization in Applications (summer semester):**

Optimization in Applications is generally a project assigned to the students including own programming and modelling. E.g. innovative optimization strategies are to be implemented in Matlab, Python or similar. Alternatively, engineering models could be subjected to optimization software.

**Leistungsnachweis****1 project** "Optimization in Applications" (3 credits) / **SuSe + WiSe****903006 Urban infrastructure development in economical underdeveloped countries****E. Kraft, T. Haupt, T. Schmitz**

Integrierte Vorlesung

Mo, wöch., 09:15 - 10:45

Mi, wöch., 09:15 - 10:45

Veranst. SWS:

4

**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

## 906014 Geo- and hydrotechnical engineering - Part: "Geotechnical Engineering" (L + E)

**P. Staubach, C. Rodríguez Lugo**

Veranst. SWS: 3

Vorlesung

Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D

Fr, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal D, Dates by arrangement

### Beschreibung

The objective of this module is focused on deepening the basics of soils mechanics, the fundamentals of analysis in applications for static and dynamic analysis as well as the basics of soil-structure interaction analysis. The students should be able to apply the strategies and methods to arbitrary engineering problems in the given fields. To fix the theoretical background the student has to apply the methods independently at given tasks during several projects.

### Geotechnical Engineering

Classification and identification of soils; Description of soil state; Water in the soil; Hydraulic conductivity and seepage flow; Distribution of vertical stress in the soil; Stress-strain relationships; Settlement analysis; Consolidation theory; Shear strength; Earth pressure; Basics of Soil Dynamics (wave propagation, laboratory and field testing, soil-structure interaction under dynamic loading); Soil Liquefaction (phenomenon, consequences, estimation of liquefaction risk, prevention)

### Leistungsnachweis

#### 1 written exam

"Geotechnical Engineering" / 90 min (50%) / **SuSe** + WiSe

## Summerschool P3: Use of Polymer-Modified Concretes (PCC) for Innovative Refurbishment Solutions

### A. Flohr

Integrierte Vorlesung

Di, Einzel, 13:30 - 15:00, Coudraystraße 13 B - Seminarraum 210, Basics of PCC, 22.08.2023 - 22.08.2023

Mi, Einzel, 09:00 - 12:30, Coudraystraße 13 B - Seminarraum 210, PCC for refurbishment solutions, 23.08.2023 - 23.08.2023

Mi, Einzel, 13:30 - 17:00, Coudraystraße 13 B - Seminarraum 210, Load-deformation behaviour of PCC / Multiscale modelling approach for PCC, 23.08.2023 - 23.08.2023

Do, Einzel, 13:30 - 15:00, Coudraystraße 13 B - Seminarraum 210, Particle interaction, 24.08.2023 - 24.08.2023

Mo, Einzel, 09:00 - 12:30, Coudraystraße 13 B - Seminarraum 210, Ex: Nano-CT, 28.08.2023 - 28.08.2023

Mo, Einzel, 13:30 - 17:00, Coudraystraße 13 B - Seminarraum 210, PCC: fresh concrete properties, 28.08.2023 - 28.08.2023

Do, Einzel, 09:00 - 12:30, Coudraystraße 13 B - Seminarraum 210, PCC: hardened concrete properties, 31.08.2023 - 31.08.2023

### Beschreibung

Concretes are modified by the addition of polymers in order to improve the durability and the adhesive strength and due to that measure they suit optimal for refurbishment applications. The microstructural changes in the binder matrix, which consists of both cementitious and polymer components, will be studied. Afterwards it will be analyzed

how they influence the macroscopic properties. The students will perform and analyze laboratory tests on different pure polymer specimens and selected concrete specimens in order to better understand the microscopic origin of the macroscopic behavior. The link between the micromechanical and macroscopic properties is briefly established using a continuum micromechanics approach. Different innovative restoration applications are addressed, in addition some examples will be shown for the use of PCC for constructional purposes.