

## Hessen: ISU Course Outline

# Introduction to Earthquake Engineering

CLASS HOURS: 20

### PROFESSOR

**Prof. Dr.-Ing. Uwe E. Dorka**, Head of Department for Steel and Composite Structures at the University of Kassel, Department of Civil Engineering

- *Office:* Kurt-Wolters-Straße 3; D-34125 Kassel - *Office hours:* by appointment
- *Email:* [uwe.dorka@uni-kassel.de](mailto:uwe.dorka@uni-kassel.de) - *Phone:* +49 561 804-2667

### Lecturer:

**Prof. Dr.-Ing. Uwe E. Dorka** and assistants

### Academic Director:

**Prof. Dr. Stephan Theobald**

- *Office:* Kurt-Wolters-Straße 3; D-34125 Kassel - *Office hours:* by appointment
- *Email:* [s.theobald@uni-kassel.de](mailto:s.theobald@uni-kassel.de) - *Phone:* +49 561 804-2679

## 1) INFORMATION ON THE COURSE CONTENT

### COURSE DESCRIPTION

The student will be made familiar with methods and recent developments in the multidisciplinary field of Earthquake Engineering, including an introduction to tectonics and seismology, earthquake risk modelling and own investigation in a street survey. The course combines lectures, exercises and practice.

### LEARNING OBJECTIVES

Students should develop a first understanding of the multi-disciplinary and complex nature of problems in earthquake engineering by acquiring basic knowledge in seismology, the behavior of structures and the seismic risk of large urban centers. They should also develop an initial understanding of modern methods to mitigate seismic risk through the improvement of the building stock.

### COURSE MATERIALS

- All material will be given during the course.

### TENTATIVE CLASS SCHEDULE

Day	Topic	Type	Remarks
1 2	Tectonics and Seismology	L E	Causes of earthquakes and tsunamis, recording and evaluation of earthquake waves, earthquake scales, earthquake descriptions- and models, earthquake estimation- and forecast.
3 4	Structures under earthquakes	L E	Typical reaction of structures, non-linear structural behaviour, soil-structure-interaction, time history analysis and response spectrum, code design and analysis, performance based design, structural control concepts, and equipment for earthquake protection, seismic testing
5 6	Invited Lecturer (1): Earthquake Risk modelling	L E+P	Principles of Risk Assessment, hazard maps, earthquake scenarios, probabilistic modelling and insurance aspects.
7	Life Lines	L	Typical damage to life lines (roads, railroads, water electricity etc.), impact on post-disaster relief and recovery, life line network assessment and improvement
8 9	Invited Lecturer (2): Seismic assessment Walk through method	L P	Seismic assessment on a regional scale: Street survey (walk through method), preliminary investigation and discussion.
10	Examination		A written exam will take place at the end of the seminar.

L = Lecture E = Exercise P = Practice

(1) Invited Lecturer: from Munich

(2) Invited Lecturer: from Middle East Technical University Ankara, Turkey

## **2) INFORMATION ON CLASS PARTICIPATION, ASSIGNMENTS AND EXAMS**

### **ASSIGNMENTS**

- Active participation in discussions and presentations, independent study

### **EXAMS**

- Written exam

### **PROFESSIONALISM & CLASS PARTICIPATION**

- Regular attendance in lectures and field trips

### **MISSED CLASSES**

No more than 10% of the contact hours can be missed for successful completion of the class.

## **3) INFORMATION ON GRADING AND ECTS**

### **ACADEMIC STANDARDS**

Upon successful completion, 3 ECTS will be awarded for the class.

According to the rules of ECTS, one credit is equivalent to 25-30 hours student workload.

### **GRADING SCALE:**

<i>Grade</i>		<i>Description</i>
<i>15 points</i>	<i>1.0</i>	<i>very good: an outstanding achievement</i>
<i>14 points</i>		
<i>13 points</i>		
<i>12 points</i>	<i>1.7</i>	<i>good: an achievement substantially above average requirements</i>
<i>11 points</i>	<i>2.0</i>	
<i>10 points</i>	<i>2.3</i>	
<i>9 points</i>	<i>2.7</i>	<i>satisfactory: an achievement which corresponds to</i>

<i>8 points</i>	<i>3.0</i>	<i>average requirements</i>
<i>7 points</i>	<i>3.3</i>	
<i>6 points</i>	<i>3.7</i>	<i>sufficient: an achievement which barely meets the requirements</i>
<i>5 points</i>	<i>4.0</i>	
<i>4 points</i>	<i>5.0</i>	<i>not sufficient / failed: an achievement which does not meet the requirements</i>
<i>3 points</i>		
<i>2 points</i>		
<i>1 point</i>		
<i>0 points</i>		

This course description was issued on: January 27, 2015. Program is subject to change.