

## Hessen:ISU Course Outline

### Energy Efficient and Smart Home Infrastructure Systems

#### CLASS HOURS

Consult program schedule

#### PROFESSOR

##### Academic Advisors:

Name: Prof. Dr.-Ing. Carsten Zahout-Heil

Office: Birkenweg 10, 64295 Darmstadt

Email: carsten.zahout-heil@h-da.de

Office hours: by appointment

Phone: +49.6151.16-30013

Name: Prof. Dr.-Ing. Ingo Jeromin

Office: Birkenweg 8, 64295 Darmstadt

Email: ingo.jeromin@h-da.de

Office hours: by appointment

Phone: +49 6151 16-30053

## 1) INFORMATION ON THE COURSE CONTENT

### COURSE DESCRIPTION – Part 1: Smart Building

The targets of building automation can be split into the topics comfort, efficiency and security/safety.

The module setup follows this guideline and teaches with a hands-on-seminar and lecture.

#### Learning Objectives

Comfort

- Improvement of living comfort by building automation.
- Individuality and measurability of comfort
- Usability and human machine interface
- State of the art and further research and link to other technologies (i.e. automotive)

Efficiency

- Definition and metric of efficiency, types of efficiency
- How building automation can influence efficiency among the supply/consumer chain

- Interaction of house, car and smart grid and its impact on efficiency

#### Security and Safety

- Opportunities for the Increase of Safety with building automation
- Simulation and Validation of Security and Safety Concepts
- State of the art security measures and current risks

### **COURSE DESCRIPTION – Part 2: German Energiewende**

The targets of the course German Energiewende can be split into the three targets to reach the German Energiewende - Energy Supply, Energy Distribution and Energy Consumption.

The module setup follows this guideline and teaches with a hands-on-seminar and lecture.

#### **Learning Objectives**

##### Energy Supply

- Physical, technical and economical basic knowledge of conventional power generation
- Important regenerative energy sources like geothermal energy, wind energy, solar energy and water power
- Composition of the German electricity
- Further research

##### Energy Distribution

- Structure, Technology and behavior of electrical supply networks
- Global differences in the design and operation of electrical power supply networks
- Integration of volatile regenerative energy sources into existing network structures

##### Energy Consumption

- Changes in energy consumption in Germany
- changed function of consumption as a pure electricity (consumer) to the temporary producer
- Examples of using battery systems or combines heat and power plants to become more independent of electricity network

### **COURSE MATERIALS**

Slides and Script

### **TENTATIVE CLASS SCHEDULE**

Date	Topic	Reading/ Assignments/ Additional Practice Materials
July 19, 2017	Energy Supply	Preparation by reading the script
July 20, 2017	Energy Distribution	Preparation by reading the script
July 24, 2017	Smart Buildings and Infrastructure Comfort	Preparation by reading the script
July 25, 2017	Smart Buildings and Infrastructure Efficiency	Preparation by reading the script

July 26, 2017	Smart Buildings and Infrastructure Safe Security	Preparation by reading the script
July 27 – August 2, 2017	Academic excursion to Cologne	
August 3 & 4, 2017	Poster presentation	
August 7, 2016	Energy Efficiency: Architecture	Preparation by reading the script
August 8, 2016	Energy Efficiency: Business Administration	Preparation by reading the script
August 9, 2016	Energy Efficiency: Civil Engineering	Preparation by reading the script

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

### **ASSIGNMENTS**

Active participation and group work on a regular basis.

### **EXAMS**

Exam in total 90 minutes and poster presentation

### **PRACTICE MATERIALS**

Handouts and Slides

### **PROFESSIONALISM & CLASS PARTICIPATION**

Students are expected to attend the classes and dedicate 1-2 hours a day for preparation through reading and self-study. The participation and self-study will enable the students to answer questions, lead discussions and to contribute with own ideas and opinions.

### **MISSED CLASSES**

No more than 10% of the contact hours can be missed for successful completion of the course module. If students miss a lecture it is their own responsibility to obtain information on the topics. In the event of sickness a medical certificate must be presented to the ISU coordinator.

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

### **ACADEMIC STANDARDS**

Upon successful completion, 6 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:**

Percentage	Grade		Description
81-100%	15 points	1.0	very good: an outstanding achievement
	14 points		
	13 points	1.3	
64-80%	12 points	1.7	good: an achievement substantially above average requirements
	11 points	2.0	
	10 points	2.3	
47-63%	9 points	2.7	satisfactory: an achievement which corresponds to average requirements
	8 points	3.0	
	7 points	3.3	
40-46%	6 points	3.7	sufficient: an achievement which barely meets the requirements
	5 points	4.0	
0-39%	4 points	5.0	not sufficient / failed: an achievement which does not meet the requirements
	3 points		
	2 points		
	1 point		
	0 points		

This course description was issued on October 25, 2016. The program is subject to change.