



## Hessen International Summer University Darmstadt – Course Outline

# In Transition to a Pure Green Energy Economy

### CLASS HOURS

75 contact hours. Please consult programme schedule for more details

### PROFESSORS

#### Academic Directors

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## 1) INFORMATION ON THE COURSE CONTENT

### COURSE DESCRIPTION

The prospects of an energy system and a whole economy relying solely on renewable energy is the topic of the International Summer University „In Transition to a Pure Green Energy Economy” at Darmstadt University of Applied Sciences. It combines scientific knowledge taught in English with hands-on experiences during field trips to companies and public institutions. The Summer University brings together technical and business perspectives and focuses especially on three challenges on the way towards a green energy economy:

1. **Transforming supply:** Technology as driver for real competitive renewable energies.
2. **Transforming demand:** Smart homes and smart cars for smart people.
3. **Transforming business:** Strategic impacts for business models.

Students will have the opportunity to establish **valuable contacts** for their future careers. To complement the classroom work, **excursions** to near and distant sights, cultural learning and many **leisure activities** outside the classroom are included in the programme.

### LEARNING OBJECTIVES

#### A pure green energy economy

- Driving forces, ingredients and status quo
- International and national political aims
- Technological and economical transition pathways

#### Transforming supply

- Competitiveness of renewable energies and regimes of promoting them
- Potentials for different renewable technologies
- Challenges of an ever-increasing share of renewables for the energy system

#### Transforming demand

- Flexibilities of different consumer groups and demand side management as business case
- Smart grids, meters and devices: Redesigning the electric infrastructure
- Electric mobility as changing factor for the energy industry

#### Transforming business

- New players, new roles, new business models in the power industry
- The future of gas in a pure green energy economy
- The “prosumer” as new ideal of the energy system of the future?

### Academic excursions

- EUREF-Campus, Berlin  
A real-world 'laboratory' for the energy revolution with over 150 companies and startups working on the campus area with its own, innovative and CO<sub>2</sub>-neutral energy concept
- Vattenfall Power Plant, Berlin  
Here, Vattenfall is currently building the biggest power-to-heat complex in Germany
- BMW Welt, Munich  
BMW exhibition: BMW's vision of the future of mobility with pure electric vehicles and autonomous driving
- Deutsches Museum, Munich  
Exhibition: Energy technology (the German museum in Munich is the world's largest museum of science and technology)

### COURSE MATERIALS

Slides and script. Recommendations for additional readings can be found in the script.

### TENTATIVE CLASS SCHEDULE

<i>Date</i>	<i>Topic</i>	<i>Reading/ Assignments</i>
Jul 17, 2019	<b>Towards a pure green energy economy</b> Contexts, concepts and challenges	Preparation by reading the script
Jul 18, 2019	<b>Renewable energies</b> Technology, potentials and competitiveness	Preparation by reading the script
Jul 19, 2019	<b>Promoting renewable energies</b> The German experience	Preparation by reading the script
Jul 22, 2019	<b>Integrating renewables into the energy system</b> Redesigning the electrical infrastructure	Preparation by reading the script
Jul 23, 2019	<b>Consumers offering flexibility</b> Demand side management for big industry and everyone's home	Preparation by reading the script
Jul 24, 2019	<b>Tesla, iBMW and more electric vehicles</b> Implications on mobility and the energy system	Preparation by reading the script
Jul 25, 2019	<b>BMW Welt, Munich</b> Future of electric mobility (academic excursion)	
Jul 26, 2019	<b>Deutsches Museum, Munich</b> Energy Technology (academic excursion)	
Jul 27-28, 2019	<b>Exploring Munich</b> Weekend program in Bavaria's capital Munich	
Jul 29, 2019	<b>Goodbye to traditional energy suppliers?</b> New business models for decentralized energy	Preparation by reading the script
Jul 30, 2019	<b>Biogas, carbon capture &amp; storage, hydrogen</b> Options for gas in a pure green energy economy	Preparation by reading the script
Aug 1, 2019	<b>Vattenfall power-plant, Berlin</b> The role for power-to-heat (academic excursion)	
Aug 2, 2019	<b>EUREF-Campus, Berlin</b> Laboratory for the energy revolution & CO <sub>2</sub> -neutral campus-concept (academic excursion)	
Aug 3-4, 2019	<b>Exploring Berlin</b> Weekend program in Germany's capital Berlin	

Aug 5, 2019	<b>Self-sufficient or delivering energy to neighbors</b> Prosumers in the new energy system	Preparation by reading the script
Aug 6, 2019	<b>How does it all fit together</b> Sector coupling, costs and outlook	Preparation by reading the script
Aug 8, 2019	<b>Examination</b> Presentation & discussion of project results	

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

### ASSIGNMENTS

Active participation and group work on a regular basis

### EXAMS

Students will work in groups of three or four on one of the course's aspects and present their results at the end of the summer university. Each group can choose the topic of its project in consent with the lecturers during the first week and then continue its research during the summer university. Subsequent to each lesson, there will be time for the groups to work on the projects and to discuss findings with the lecturers. The examination takes place as combination of the presentation of the project-findings and their defense by all group members.

### PRACTICE MATERIALS

Handouts, slides and additional literature.

### PROFESSIONALISM & CLASS PARTICIPATION

Students are expected to attend the classes and dedicate 1-2 hours a day for their projects and the preparation of classes.

### 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 International Summer University 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
90-100%	15 points	1.0	very good: an outstanding achievement
	14 points		
	13 points	1.3	
80-90%	12 points	1.7	good: an achievement substantially above average requirements
	11 points	2.0	
	10 points	2.3	
70-80%	9 points	2.7	satisfactory: an achievement which corresponds to average requirements
	8 points	3.0	
	7 points	3.3	
60-70%	6 points	3.7	sufficient: an achievement which barely meets the requirements
	5 points	4.0	
0-60%	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 January 15, 2019. The program is subject to change.