



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 CO₂-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	Towards a pure green energy economy Contexts, concepts and challenges	Preparation by reading the script
Jul 18, 2019	Renewable energies Technology, potentials and competitiveness	Preparation by reading the script
Jul 19, 2019	Promoting renewable energies The German experience	Preparation by reading the script
Jul 22, 2019	Integrating renewables into the energy system Redesigning the electrical infrastructure	Preparation by reading the script
Jul 23, 2019	Consumers offering flexibility Demand side management for big industry and everyone's home	Preparation by reading the script
Jul 24, 2019	Tesla, iBMW and more electric vehicles Implications on mobility and the energy system	Preparation by reading the script
Jul 25, 2019	BMW Welt, Munich Future of electric mobility (academic excursion)	
Jul 26, 2019	Deutsches Museum, Munich Energy Technology (academic excursion)	
Jul 27-28, 2019	Exploring Munich Weekend program in Bavaria's capital Munich	
Jul 29, 2019	Goodbye to traditional energy suppliers? New business models for decentralized energy	Preparation by reading the script
Jul 30, 2019	Biogas, carbon capture & storage, hydrogen Options for gas in a pure green energy economy	Preparation by reading the script
Aug 1, 2019	Vattenfall power-plant, Berlin The role for power-to-heat (academic excursion)	
Aug 2, 2019	EUREF-Campus, Berlin Laboratory for the energy revolution & CO ₂ -neutral campus-concept (academic excursion)	
Aug 3-4, 2019	Exploring Berlin Weekend program in Germany's capital Berlin	

Aug 5, 2019	Self-sufficient or delivering energy to neighbors Prosumers in the new energy system	Preparation by reading the script
Aug 6, 2019	How does it all fit together Sector coupling, costs and outlook	Preparation by reading the script
Aug 8, 2019	Examination 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.