Hessen:IWU – International Winter University Program 2026 – Course Outline

More information: https://wup.h-da.de/

Energy Lifestyles: A Technical Comparison Between Nations

PROFESSORS
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1) INFORMATION ON THE COURSE CONTENT

COURSE DESCRIPTION

Energy Lifestyles: A Technical Comparison Between Nations is an interdisciplinary course that explores how different countries generate, transmit, and consume energy across sectors such as residential, commercial, industrial, and transportation. Moving beyond a binary comparison, students will investigate the technical and cultural dimensions of national energy lifestyles, drawing from global data sources including the International Energy Agency (IEA) and Lawrence Livermore National Laboratory (LLNL).

Through analysis of official energy flow diagrams and international datasets, students will develop a foundational understanding of concepts like energy efficiency, transmission losses, and the influence of energy imports on national security. Engineering fundamentals—such as Ohm's Law, flow and pressure dynamics, and energy conversion—serve as the technical core of the course.

Emphasizing both collaborative discussion and independent research, the course guides students in evaluating renewable and nonrenewable sources, interrogating common assumptions about sustainability, and comparing a third country of their choice to deepen global insight. The course encourages students to critically assess energy use not only through environmental and technical frameworks but also through the lenses of economics and culture—preparing them to engage thoughtfully in international dialogues on sustainable energy futures.

LEARNING OBJECTIVES

1. **Evaluate national energy systems** by interpreting energy flow data and comparing patterns of generation, transmission, and consumption across multiple sectors and countries, with a focus on identifying key differences in efficiency, sustainability, and energy security.

2. **Assess the impacts of energy choices** by analyzing the technical, economic, and cultural implications of renewable and nonrenewable energy sources, and formulating evidence-based comparisons and recommendations for sustainable energy strategies in different national contexts.

COURSE MATERIALS

Web access. Important links are:

1. https://www.footprintcalculator.org/home/en
2. https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser?country=WORLD&fuel=Energy%20supply&indicator=TESbySource

3. https://ourworldindata.org/grapher/per-capita-energy-use?country=~BRA
4. https://flowcharts.llnl.gov/commodities/energy

TENTATIVE CLASS SCHEDULE
Class hours: 60 contact hours
Self-study: 60 contact hours
(1 contact hour = 45 minutes)

Date	*Topic*	*Type of Seminar*
December 2025	**Virtual Pre-Arrival Session**	Online
December 2025	**Academic introduction**	Online
December 2025	**Virtual group work**	Online
December 2025	**Virtual group work**	Online
December 28, 2025	**Arrival in Darmstadt**	Darmstadt
Jan 02, 2025	**Course Introduction and Energy Use in the United States Stereotypes**	Darmstadt
Jan 05, 2026	**Energy Lifestyles Overview – Presentation of Class Lifestyles**	Darmstadt
Jan 06, 2026	**Systems Thinking: Inputs, Logic, Outputs and Energy Units**	Dieburg
Jan 07, 2026	**The Myth of Green Energy and Lifecycle Thinking**	Darmstadt
Jan 08, 2026	**Energy Flow Charts: LLNL and IEA – Understanding Formats and Metrics**	Darmstadt
Jan 09, 2026	**Comparing National Energy Imports and Energy Security**	Darmstadt
Jan 12, 2026	**Transmission Concepts: Pressure, Flow, Series vs Parallel Systems**	Darmstadt
Jan 13, 2026	**Electricity Generation: AC/DC, Steam Turbines and the Power Grid**	Frankfurt a. M.
Jan 14, 2026	**Residencial, Commercial, and Industrial Energy Use**	Darmstadt
Jan 15, 2026	**Transportation Energy Sources and Efficiency**	Darmstadt
Jan 16, 2026	**Seminar: Final test/presentations**	Darmstadt
Jan 17, 2026	**Departure from Darmstadt**	Darmstadt

EXCURSIONS (subject to change)
Excursion in the Rhein Main area will be announced later.

2) INFORMATION ON CLASS PARTICIPATION, ASSIGNMENTS AND EXAMS

ASSIGNMENTS

Consistent active participation and engagement in group work are expected throughout the course. Between the virtual sessions and in-person seminars, students will be required to complete a group project, which will be presented as part of the course program.

FINAL EXAMS

Objective: To research and compare the energy use of a selected country (excluding Germany and the USA) in a specific sector with that of the USA and Germany. Groups will be identified in the course meeting by the second meeting.

Presentation Requirements:

- Create a 5-slide summary presentation of your paper.
- Present the highlights of your findings: key comparisons, conclusions, and recommendations.
- The presentation will be delivered during the final class session.
- Select one country (excluding Germany and the USA).
- Choose one energy sector: Transportation, Industrial, Commercial, or Electric Production.
- Compare the selected country's energy use in the chosen sector to the USA and Germany.
- Use technical data and credible sources to support your comparisons.

PRACTICE MATERIALS

See the list of online resources to be used.

PROFESSIONALISM & CLASS PARTICIPATION

Students are expected to attend all class sessions and dedicate approximately 1–2 hours per day to preparation through assigned readings and independent study. This preparation will enable students to engage actively in class by answering questions, contributing their own ideas and perspectives, and participating in discussions in a meaningful and informed manner.

MISSED CLASSES

Students may not miss more than 10% of the total contact hours in order to successfully complete the course. In cases of absence, it is the student's responsibility to stay informed about the content and assignments covered during the missed sessions. Absences due to illness must be submitted as a written email before the course to the Winter University Program 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	

	5 points	4.0	sufficient: an achievement which barely meets the requirements
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/updated May 02, 2025. The program is subject to change.