vs. 10 January, 2023 Periods III-IV 2023

PHYS-C1380 Multi-disciplinary energy perspectives (5 cr)

Background

Energy is one of humankind's grand challenges linked to climate change, human development, sustainability, economy, and innovations, among others. Finding effective solutions to these will require stronger systemic thinking and multiple skills, beyond the specific technology knowledge.

Multi-Disciplinary Energy Studies (MES) is a new Aalto-minded approach to the energy and society nexus. It is an elective master's Minor, with three major perspectives into energy: science & technology, economics & business, and social sciences & human behavior.

The Multidisciplinary Energy Studies (MES) is a collaborative teaching effort between several disciplines of Aalto University, such as system analysis, energy sciences, information technology, business, economics, social sciences and art and design.

PHYS-C1380 Multi-disciplinary energy perspectives

PHYS-C1380 "Multi-disciplinary energy perspectives" is an introductory course to modern thinking in energy. The course deals with key factors that influence the way we use and produce energy, how different disciplines approach energy and why, and to apply your own discipline in energy problems.

The course discusses foundational elements and solutions for energy by combining science and engineering, economics and business, social sciences and human behaviour. Applying multi-disciplinary thinking to real-life energy case problems and understanding the links between different disciplines and the complexity of energy, through cases such as Sustainable Energy, Green-ICT, Energy Markets, Green Business, Smart Power, E-Mobility, among others.

Course Outline

The course starts with the first lecture on Monday 19th January. The detailed course schedule will be available on the course pages in MyCourses. Lectures are on Mondays and Thursdays 14:15 - 16:00. The lectures will be organised physically at the Aalto campus. Note that some of the lectures are on the exercise session times on Mondays 14:15 - 16:00. After each lecture, the students are to write lecture diaries that constitute part of the course grade. The second part of the course consists of a group work project delivered in the form of presentations.

The lectures are recorded and shared with participants via Panopto after each lecture, normally within one working day. Also group presentation will be recorded. Exercise sessions will not be recorded.

The course is obligatory for students, who will take the MES Minor, but all students interested in 'energy and society'-theme are welcome. The course is for master's or post-graduate students mainly, but advanced Bachelor students are also welcome.

Structure of the course

The course has three learning elements, explained below:

1. Lectures and lecture diaries (homework)
2. Exercise sessions
3. Group work (teamwork, project presentations).

1. Lectures and Lecture Diaries

a. Lectures (contact teaching unless otherwise informed; streamed also online)

Format: physical lectures (recorded), including invited speakers. 8 lectures, total 16 hours.

The lecture slides will become available on MyCourses web pages after the lectures. Some lectures or related pre-reading material will be published before the lecture sessions, in which case students will be informed about those by messages from My Courses web page of the course and emails in advance. The lectures will be recorded and shared with the participants.

b. Lecture Diaries

The lecture diaries should be submitted either in a pdf or a Microsoft document file format to MyCourses web page of the course before the beginning of the next lecture session each week. The diaries should be written in English language, making use of Times New Roman with font size 12 and 1.5 line spacing. The lecture diary should not exceed 2 pages for each lecture session unless otherwise explicitly mentioned. Instructions on writing the diaries are elaborately published in the MyCourses section for assignments.

2. Exercises (contact teaching unless otherwise informed)

Learning and applying methods and cases. Format: Guided exercise session (physical).

Three 2-hour exercise sessions, each including group discussions, group work around a key question and unwrapping and discussion within the active session. Exercises are mandatory to attend and only in very special cases can be pre-negotiated before absolutely necessary absence. The exercise sessions will also have updates for course progress and elaborate explanation for group work and all other assignments that are necessary to pass the course.

Lecture material, exercises instructions will become available through MyCourses.

3. Group project work (presentations are contact teaching unless otherwise informed)

The latter part of the course involves a group work on a selected multidisciplinary energy topic. A list of topics with short description will be given, but participants are also welcome to propose their own topic (within the general scope and spirit of the course). Period IV is devoted to the group work, but the teams can start working already earlier.

- 9 groups of 3 - 5 persons (ideally 4)
- Project topics are related to the topics of the lectures
- Progress and results reported through three presentations:
    1. Progress presentations
    2. Dress rehearsal presentation
    3. Final presentation
- Each group acts as opponent to one other group, giving constructive feedback

Project topics and organization of the project work part will be introduced later in the course.

Attendance

Attendance in the **lectures** is not mandatory, but physical attendance is highly encouraged due to the discursive nature of the course. The purpose of online streaming the lectures via Zoom and recording them is only to serve as a backup for those who cannot physically participate in the lectures.

Attendance in the **exercise sessions** is mandatory. Inform the course assistant in advance if you cannot participate a session. Additional homework may be given to compensate for a missed exercise.

Attendance in the **group work project presentations** is mandatory. This means your own team's progress (1) and dress-rehearsal presentation session (1), and all the final presentation sessions (3).

Use of AI assistant tools

We experiment in creative use of AI-assistants for enhanced learning in this course

2023 will likely see a revolution in AI-assisted learning in higher education, but we don't know yet how. Let's use this as an opportunity to experiment with new, creative ways of AI-assisted learning, share the experiences and best practices, and critically discuss the use and role of AI tools in learning. A group work project topic is also offered for those particularly interested in AI tools.

Students are welcome to use artificial intelligence (AI) tools as personal learning assistants in this course, provided they disclose the use and reflect on it in their submitted lecture diaries. The rules are:

1. **If you use AI tools for preparing a lecture diary, begin the submitted filename with "AI", for example: "AI - Lecture diary 1 - Sarah Student.pdf"**. By doing so, you are allowed to use AI in that lecture diary, and you opt-in to allow a project team to use your submission as research material in their work (see below).

2. **Write at the end of your learning diary your notes** about your experience using the AI tool(s). You may refer to your previous submission(s), where you may have used another tool, or used the same tool differently. What did you learn about its use? Most importantly, think critically, and write how the tool was helpful in your learning, or how it failed to enhance your learning (in one way or another). The project team may give further instructions as they start their project work (see below).

3. **The teaching staff or the project work team may or may not check your submission with an AI detection tool**. If they detect a likely case of undisclosed use of AI in a diary text, they may flag it and ask you for an explanation. Avoid submitting AI-assisted work without disclosing its use. It will not deduct your points, but it will increase the teachers' workload. We are interested to learn how you used AI tools and your experiences about using them. We believe we are in the same boat with you: our purpose is to enhance your learning not only by allowing you to do your work more efficiently, but also do it more effectively – by improving your learning. Let's together figure out how.

4. **Be willing to share your experiences using AI tools in learning with other students**. One (or more) of the team project works will study the use of AI tools for learning multidisciplinary energy perspectives (as in this course). The project team will be given access to the lecture diary submissions of those course participants who opt-in for it by marking their submissions (see above). In other words, they will use your reflective notes as research material for their project. Their project will summarize the experiences of others for the benefit of us all.

5. **Of course, using AI tools is optional!** You can submit all or some of your diaries without using AI tools in their preparation. Even if you are interested in using them, it is good to write a some of the diaries without them as a point of comparison.

Assessment and grading

The **minimum requirements for passing the course** are:

- Attendance to all exercise sessions¨
- Attendance to team's progress and dress-rehearsal session and all final presentation sessions
  - 1 - 2 missing attendances can be compensated with an extra assignment, or by attending some other energy-related Aalto talk or event and writing the lecture diary assignment on it (the event must be agreed with the teacher in advance).
- All (8) lecture diaries (homework) submitted and accepted
- All three group work presentations given and accepted
- All peer assessments submitted
- Opponent tasks contributed as part of a team

Grading and assessment principle

The course grade is combination of the individual students' grade (40 %) and group grade (60 %) and consists of the following parts:

Individual work	**Weight**	**Scale**
8 lecture diaries / assignments	5 % x 8	0 – 5
Individual grade	**40 %**	
Teamwork		
Group work presentations:		
Progress presentation	10 %	0 – 5
Dress rehearsal pres.	20 %	0 – 5
Final presentation	30 %	0 – 5
Group grade	**60 %**	
Total	**100**	

Note: Note: Poor opponent performance can lower the grade and outstanding opponent performance can increase the grade.

Peer assessments

Peer-assessment will be used also to estimate the amount and quality of the individuals' contributions to the group's work. In the peer assessment, each member of the group evaluates his/her own as well as other group members' contributions to the team's work and results anonymously. The result of the peer assessment can increase or decrease the individual's grade compared to the group's grade.