Aalto University
School of Business

Energy Business and Innovation

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21E16100

Introduction

16th April 2019

Aalto University
School of Business

Overview

- Background
- Practical issues
- Group work introductions
- Key concepts

How EBI course came to be

Extensive social energy research at BIZ and ARTZ during last decade

- Large research consortiums, high number of publications, huge range of topics (energy consumption, user innovation, innovation intermediaries, energy communities…)

Energy transition, industry renewal, is systemic and requires multidisciplinary approach

Aalto offering was: technology, markets/economics, less about innovation, systemic change / transitions

30% of GHG are coming from energy industries

Teachers

Jouni K. Juntunen

- Professor of Practice (Aalto BIZ & ARTS)
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- jouni.juntunen@aalto.fi

Paula Kivimaa

- Senior Research Fellow (SYKE & University of Sussex SPRU)
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How about you?!

Business School Technical Schools
Design School

Advanced Energy Solutions (9)

ENG/EEN (3) ?

Chemical engineering (1)

Industrial engineering (1)

Creative Sustainability ARTS (4), BIZ (6), Tech (1)

Accounting (2)

Communications (1)

(Global) Management, CEMS (8)

Exchange (2)

Practical Issues

General description of the course

- **Position**
  - M.Sc. degree, elective course in CS and AES, open for all Aalto students, international exchange, JOO students
- **Learning outcomes**
  - The objective of the course is to develop students' abilities to understand distributed energy production and consumption from social sciences perspective. The course develops students' knowledge on sustainability transitions and familiarizes students with contemporary concepts driving energy transition e.g. prosumerism. Furthermore, it addresses renewable and energy efficient business models, different types of innovation systems, innovation dynamics and diffusion.
  - Professionalism!
- **Content**
  - **Context:** Energy business and its' renewal inc developing markets
  - **Sustainability transitions:** public policy and transition management, history
  - **Innovative approaches:** active roles for consumers, business models

'Utilities are not innovators. This is the most distant thing from Silicon Valley probably you can think of in terms of speed of change.'

—Alberto Gandolfi, Head of European Utilities Research Team, Goldman Sachs

(Europe's Energy Evolution podcast, Oct 1, 2018)

Program of the course (1)

Date	Content	Notes	Readings
Tue 16.04 13-16	Introduction Course practicalities	Vote your topic by tomorrow 17.4.	-
Tue 23.04 13-16.15	Current energy market review Meetings with groups		-
Thu 25.04 13-16.15	Infrastructure of consumption Meetings with groups		articles (2)
Thu 02.05 13-16	Myths of innovation	Assignment 1 deadline 01.05.	articles (3)
Tue 07.05 13-16	Sustainability transitions approaches		articles (1)
Thu 09.05. 13-16	Public policy and energy transitions		articles (2)

Program of the course (2)

Date	Content	Notes	Readings
Tue 14.05 13-16	Role of users and communities in energy transitions	Assignment 2 deadline 13.05.	articles (1)
Thu 16.05 13-16	Climate & Energy Policy Negotiation Game		
Tue 21.05 13-16	Business models Developing world and energy challenges and opportunities	Assignment 3 deadline 20.05.	Articles (3)
Thu 23.05. 13-16	Energy Tech Financing		Articles (3)

Exam dates

Date	Content	Registration
Thu 31.05.19 9-13 R001/U4	Exam 1	(Register through WebOodi!)
Wed 04.09.19 9-13 R038U006	Exam 2	Register through WebOodi!
Mon 04.11.19 16-20 R101B-163	Exam 3	Register through WebOodi!

Individual Assignments

Personal assignment 1 is due 1.5.

Personal assignment 2 is due 13.5.

Personal assignment 3 is due 20.5:

Submit assignments to MyCourses Assignment box.

Grading: Pass/fail +2 points

Group work

- Select the theme you are interested (5 options)
- Group size will be approximately 6 persons
- Max 10 pages final report
- PPT final presentation

Group work themes

1 Nordic Development Fund x 2

2 Joukon Voima

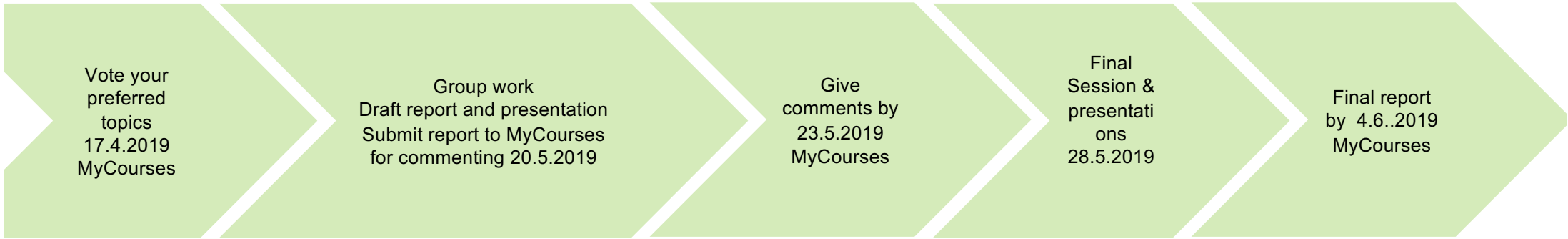
3 Optiwatti

4 Lumituuli

Group work final report structure (if not agreed something different)

1. Background and purpose of the study
2. Literature review (main concepts)
3. Data collection / review procedure
4. Analysis and Findings
5. (Managerial and policy implications)

Group work timeline



Info about topic/group By 18.4.2018 MyCourses

Info which group to comment 19.5.2018 MyCourses

Submit word doc for commenting

1 comment file by a group. Work first independently but consolidate

10 pages Report

Book a session to discuss about framing if not clear Jouni.Juntunen@aalto.fi

17.4.2019 is important !

Vote which groups you are interested

If you don’t, I do not assign you to groups and I assume that you are not going to continue this course.

Evaluation

- **Credits: 6**
- **Evaluation based on:**
  - exam (64%)
  - group work (30%)
  - individual assignments (6%) / pass/fail
- **70% presence required**
  - (present at least at 6 lectures)
- **Exam material:**
  - Lecture slides
  - Readings

- **Individual assignments (3)**
  - Pass (+2p)/fail
- **Group work evaluation: 0-30 points scale**
  - Max 5 points from commenting other group's paper
  - Max 10 points from the presentation
  - Max 15 points from the final report

Classroom participation

Why do we encourage classroom discussion?

- Seeing whether you learn and understand our message
- Seeing how you interpret the topic of the lessons
- Making learning a joint experience
- Learning from each other

Why is it important to learn to articulate and argue for your views?

- The world does not work only through writing texts (exams). Particularly sustainability issues are often controversial topics. It is useful if you are able to articulate your knowledge and viewpoints. We rehearse this in the classroom.

Practicalities

I’m available in R208. You are welcome.

All communications via Mycourses. Do not email me directly.

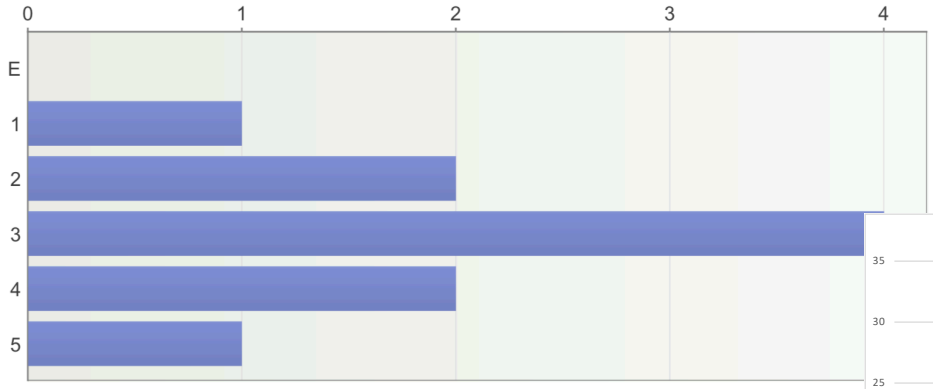
Feedback

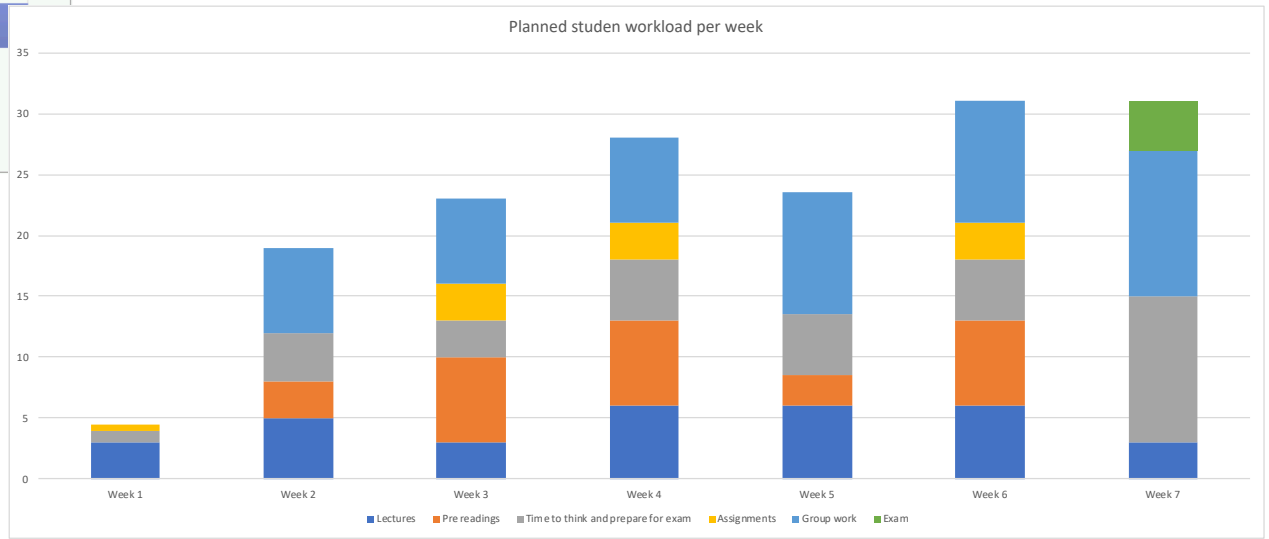
- **This is the second time this course is organized**
- **Feedback is very important to improve the course:**
  - Content, which topics to omit which to add?
  - Workload?
  - Learning/teaching methods, both sessions and group work?
  - Scheduling (assignments and group work)?
  - Number and quality of visiting lectures?
  - Overlap with other courses?
- **Feedback is voluntary but helps "younger generations"**

Improvements since last year (1/2)

4. According to the guidelines, one credit (ECTS) requires 27 hours of student work. Compared with this, the completion of the course required E=Not applicable, 1= Considerably less time, 2= Slightly less time, 3= The right amount of time, 4= Slightly more time, 5= Considerably more time

Number of respondents: 10





Improvements since last year (2/2)

“I had an impression that the course content should focus more on "Business" and "Innovation" from the energy

perspective. “

->Finance aspects included

The discussion in the class was a bit dry but this tool might help somehow.

I would prefer more dynamic and inter-active lectures where things are discussed further, together with small problems or activities to support our learning.

-> More pair/group discussion & Presemo going to be used

The group assignment description could be more specified

-> Descriptions has been elaborated, more f2f time with groups

Group work topics were presented as research questions instead of general themes

-> This has been included as well. Clear RQs.

There is too much work for 6 credits. The groupwork requires a lot of effort and time and should be more than the 40% of the final grade. In addition, the individual assignments should contribute to the final grade.

-> Was not possible to change. Course descriptions had to be done for 2 years and feedback came late.

Concepts and Definitions

Innovation

Defining Innovation(Based on “Oslo Manual”, 3rd edition, 2005)

An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. The minimum requirement for an innovation is that the product, process, marketing method or organizational method must be new (or significantly improved) to the firm.

Defining decentralized energy and micro-generation

- Decentralized energy supply refers to the generation of energy close to the place where energy is used.
- It can mean a range of generator sizes; from residential households to community or district-level.
- Micro-generation is the term given to small-scale local energy generation, and it has various definitions, which vary from country to country.
- The key characteristics of these definitions are that micro-generation occurs at a local scale, it can include both the generation of heat or electricity or both, and it generates small amounts of energy compared to centralized plants. Furthermore, there is often a requirement of environmental friendliness in the production.
- For example in the UK, the Energy Act section 82 defines micro-generation as generating plant with a capacity of less than 50 kW. Most residential installations are in the range of 2.5–3 kWp. In the case of electricity, it can be for the sole use of the building's occupants or it can feed the National Grid.

Common micro-generation technologies

Energy Source	Energy Technology	Output Power Type
Hydro power	Water turbine	Electricity
Wind	Wind generator	Electricity
Solar	PV solar	Electricity
Solar	Solar thermal collector	Heat (water)
Solar	Solar air collector	Heat (air)
Wood	Fireplaces	Heat (air or water)
Wood	Wood burning boiler	Heat (water)
Wood pellet	Wood pellet boiler	Heat (water)
Outdoor air heat (+electricity)	Air source heat pump	Heat (air)
Outdoor air heat (+electricity)	Air to Water heat pump	Heat (water)
Ground heat (+electricity)	Ground source heat pump	Heat (water)
Indoor air heat (+electricity)	Exhaust air heat pump	Heat (air)
Various sources (e.g. bio-gas, wood, wood pellet)	Micro-CHP	Heat and electricity

Sustainable energy

Interested about innovations: Some reading suggestions

Rogers: Diffusion of innovations

Chesbrough: Open innovation

Christensen: The Innovator's dilemma

Von Hippel: Free innovation