ME2322 Industrial transformation and technological innovation
3.0 hp

Course PM
Autumn 2024

Course description

The aim of the course is for the students to acquire concepts, models, and theories on industrial transformation and technological innovation in order to analyse and understand how important societal challenges affect industry and technological development as well as how critical challenges can be handled. The course deepens the discussion and analysis of societal challenges identified in ME2321 Engineering and the Global Challenges. The unit of analysis in this course focuses on the meso level, which means large and complex systems involving many actors, typically both public and private. The course includes models and theories on socio-technical systems, path dependencies, industrial symbiosis, and the role of different actors in systems being transformed by incremental and radical innovation.

Intended learning outcomes

After completed course, the student should be able to:

1. Describe, explain and use concepts, models and theories to analyse industrial dynamics and technological innovation. Among others applied to industrial development in Sweden.
   Original in Swedish: Beskriva, förklara och använda begrepp, modeller och teorier för att analysera industriell omvandling och teknisk innovation, bland annat applicerat på den svenska industrins utveckling

2. Analyse how societal challenges affect industrial dynamics and technological innovation, as well as how industrial dynamics and technological innovation affect the societal response to these challenges.
   Original in Swedish: Analysera hur samhällsutmaningar påverkar industriell omvandling och teknisk innovation, liksom hur industriell omvandling och teknisk innovation påverkar samhällets möjligheter att hantera dessa utmaningar.

Learning activities

Lectures
  • 12h + ca 12h preparation
Seminars
  • 6h + ca 30h preparation
Exam
  • Oral exam 0.5h
  • 16 h Preparation

The lectures are intended to illustrate and provide examples of concepts, models and theories leading to deeper understanding of the course content. There will be reading material in preparation for each lecture and the level of the lectures is adapted accordingly. The seminars will be used to present and discuss project assignments. In the projects (INL1), students will be asked to choose an area of interest which meets critical societal challenges, and then apply the course content to analyse these. Expected workload is around 10h per seminar. The project work is intended to support the students in their preparation for the exam. The seminars will also be used to give feedback on presenting analyses orally and in writing.

Examination
If the course is discontinued, students may request to be examined during the following two academic years.

Betygsskala
A, B, C, D, E, FX, F
Examination
INL1 - Assignments, 1,0 hp, grading: P, F
TEN1 – Oral exam, 2,0 hp, grading: A, B, C, D, E, FX, F

In addition to the preparatory assignments for each lecture, there is a group project where students are asked to analyse a technology shift by using different models and perspectives from the course. This is presented in three mandatory seminars.

The exam will be an oral exam, and it will take place during 3 days in January. Students will have the opportunity to sign up to a time spot on canvas. The exam will be 30 minutes long and will have the format of a discussion between a senior faculty and the student. The oral exam will be split among a number of faculty at Indek. The oral exam examines both learning objectives of the course and will cover understanding of the main concepts, models and theories of the course as well as their application. More detailed information about the oral exam, along with grading criteria, will be published on Canvas at least a month before the exam.

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Detailed plan

Date	Topic	Lecturer
2024-10-29	Le1 Introduction	Andreas Feldmann
2024-10-30	Le2 Large technical systems and multi-level perspective	Niklas Arvidsson
2024-11-06	Le3 Survival of the fittest? Path dependencies and development blocs	Andreas Feldmann
2024-11-07	Supervision, project selection	Andreas Feldmann
2024-11-12	Le4 Managing the system boundaries	Andreas Feldmann
2023-11-15	Seminar 1	Jonas, Beatriz
2024-11-19	Le5 Industrial symbiosis	Andreas Feldmann
2024-11-26	Le6 Final lecture – cases and concluding remarks	Andreas Feldmann
2024-11-29	Seminar 2	Jonas, Beatriz
2024-12-03	Seminar 3	Jonas, Beatriz
2024 v2	Oral exams	TBD