

# COURSE PLAN

PhD- Course IØ 8503- Spring 2011

Multi-Disciplinary Research –  
Theoretical and Methodological Approaches

- Responsible:** Prof. Annik Magerholm Fet, Department of Industrial Economics and Technology Management, [annik.fet@iot.ntnu.no](mailto:annik.fet@iot.ntnu.no)
- Faculty of Approval:** Faculty of Social Sciences and Technology
- Working hours:** 10 credits
- Objective:** The course shall deliver the students insights on the theories and research traditions of distinct disciplines and their interactions. It should also give support to develop an individual research design for the students' concrete "research-case". This design includes the ability to understand which methods from the Natural Sciences, Technology, the Humanities and Social Sciences are appropriate for the particular work, how to classify and give preference to the single approaches and how to integrate them in the doctoral project where sustainability, industrial ecology and environmental responsibility has a central position.
- The course-content covers central research methods: - qualitative and quantitative methods, - systems theory and engineering, - business research methods and action research. In addition the course will give an overview of the most relevant decision supporting methods related to industry; environmental management, material flow analyses, LCA, risk assessment, multi criteria decisions support tools and standardisation methodologies and their implication on development and improvements on products, processes, organisations and value chains. Strategies and logistics in industrial networks will also be touched upon if relevant. Some attention will be given to writing for peer-reviewed journals.
- Modes of teaching:** Lectures, group work and presentation, plenary discussion.
- Examination req.:** Obligatory course attendance. An essay (10-15 pages) is to be delivered by 30<sup>th</sup> June 2011. The essay will be evaluated with grades from A-F.
- Education req.:** PhD-programme access.
- Participants:** The course is suitable for PhD- candidates who work in the field of technology, engineering, environmental planning, social and political sciences and environment.

## **Course plan**

The course will be conducted through three meetings:

**Meeting 1:** Research theory and methodologies (**Week 9**)

**Meeting 2:** Decision supporting methods and tools (**Week 14**)

**Meeting 3:** Scientific writing and presentation (**May/June**)

### *I. Meeting: Research theory and methodologies (Week 9)*

- Day 1** 28.02 **Location: F5, Gamle Fysikk, NTNU, Gløshaugen, Trondheim**  
14-17  
Presentation of course objectives and literature  
Conceptual background of multidisciplinary research fields  
Systems theory
- Day 2** 01.03, **Location: F5, Gamle Fysikk, NTNU, Gløshaugen, Trondheim**  
9-17  
Introduction to multidisciplinary research  
Research methodology – qualitative versus quantitative  
Business research techniques:  
- Interview techniques, use and interpretation  
- Surveys, design and statistical analysis
- Research design and epistemology of research  
Colloquium: Development of the PhD students' research design
- Day 3** 02.03 **Location: Room 1164, SB 1, NTNU, Gløshaugen, Trondheim**  
9-12  
Industrial ecology and green economy, frameworks for sustainability  
13-15  
Action research

### *II. Meeting: Decision supporting methods and tools (Week 14)*

- Day 1** 04.04. **Location: F5, Gamle Fysikk, NTNU, Gløshaugen, Trondheim**  
14-17  
Quantitative approaches:  
Systems engineering methods  
Stakeholder analysis  
Environmental and CSR management methods  
Standardization as supporting methodology
- Day 2** 05.04 **Location: F5, Gamle Fysikk, NTNU, Gløshaugen, Trondheim**  
9-16  
Quantitative methods:  
Material flow analysis, and LCA  
Risk analysis  
Indicators in communication
- Colloquium: PhD students' research design progress and challenges
- Day 3** 06.04 **Location: Room 1164, SB 1, NTNU, Gløshaugen, Trondheim**  
9-16  
Multi Criteria Decision Analysis (MCDA)

### *III. Meeting: Scientific writing and presentation (to be decided later)*

- Day 1** **Location: to be announced**  
9-15  
Documenting results; writing for scientific and peer-reviewed journals
- Colloquium: implications of corporate responsibility for PhD students' research
- Day 2** **Location: to be determined;**  
Final lectures will be tailored to the research cases of the PhD students  
Students will present their research cases in the final lecture gathering