



PhD Course

Sustainable Operations Management

Winter semester 2018/19

Course Type: Lecturer / student presentations, case assignment, and discussion

ECTS: 4

Lecturers: Prof. Dr. Martin Grunow, Verena Depping, Dr. Bryndís Stefánsdóttir

Dates: January 25, 2019 10:00-18:00, February 21 and 22, 2019, 10:00 – 17:00

Location: 1517/1519

Language: English

Registration: Please register by sending an email to Martin Grunow (martin.grunow@tum.de) by January 8th, 2019 (with submission of CV to assess suitability of background).

Course content:

Sustainability plays an increasingly important role in operations management. Quantifying environmental impacts as well as considering them in management decisions requires advanced multi-method approaches. Participants will therefore be qualified to combine methodologies from different domains to create effective decision support. Such multi-method based approaches are at the core of modern operations research reaching out to neighboring disciplines.

We investigate how sustainability assessments can be obtained and integrated in modelling approaches for operations and supply chain management. The course includes an introduction to sustainability and to Life Cycle Assessment (LCA), which is one of the most commonly used quantitative tools for the systematic evaluation of environmental aspects. We will also introduce multi-criteria decision making (MCDM) approaches such as multi-objective optimization (MOO) and show how both LCA and MCDM can be combined in a multi-method approach to provide insights and sustainable solutions.

The state-of-the-art will be summarized drawing on recent textbooks on sustainable operations and MCDM, review papers, and research papers. However, a large part of the class will be devoted to the solution of a new case recently developed by the lecturers. The case provides first-hand experience of the development of multi-method approaches for sustainable operations.



Requirements:

The participating PhD students are expected to have an advanced background in quantitative operations management methodologies from e.g. a master's degree program in Operations Research, Applied Mathematics, or Industrial Engineering.

Course setup:

This course offers hands-on experience in the implementation of an LCA in the software package SimaPro and of mathematical program in OPL or other algebraic modelling environments. For this purpose, sustainable operations management, MCDM, and quantitative sustainability assessments with LCA will be introduced on the first day and a case study will be presented.

In addition, each PhD student will be assigned a specific planning challenge in sustainable operations management, based on a research paper and potentially some additional background material (in the assignment of papers, we will aim for a good fit with the participant's research interests and/or PhD research).

The PhD students are expected to work on the case study (i.e. prepare a paper with a maximum length of 10 pages and an accompanying presentation) and the selected planning problems (i.e. work out a presentation of 30 minutes) between kick-off session on the first course day and presentation sessions on the second and third course days. The lecturers' presentation of several examples of research related to sustainable operations management will round off the course and will provide, together with the student presentations, a good overview of the state-of-the-art in this research field.

**Preliminary schedule:**

Date	Time	Session	Person	Notes
25.01	10.00-18.00	<p>Morning:</p> <ul style="list-style-type: none"> - Welcome / Introduction - Introduction to sustainable operations management <p>Afternoon:</p> <ul style="list-style-type: none"> - Introduction to life cycle assessment - Introduction to case study 	Lecturers	<p>Hand-out of paper related to sustainable operations and of case study to work on</p> <p>Deadline to hand-in the case study paper (max. 10 pages) and presentation of the case: 18.02, 09:00 (files by e-mail to bryndis.stefansdottir@tum.de)</p>
21.02	10:00-17:00	<p>Morning:</p> <p>Presentation and discussion of case study work</p> <p>Afternoon:</p> <p>Presentation of selected planning problems in sustainable operations management</p>	<p>PhD students & lecturers</p> <p>PhD students</p>	<p>PhD student presentations of case study</p> <p>PhD student presentations based on assigned journal papers</p>
22.02	10:00-17:00	<p>Morning:</p> <p>Presentation of selected planning problems in sustainable operations management</p> <p>Afternoon:</p> <p>Presentation of selected planning problems in sustainable operations management:</p> <ul style="list-style-type: none"> - Energy use in food processing - Food waste in the catering sector - Design of reverse network for WEEE <p>Wrap-up</p>	<p>PhD students & lecturers</p> <p>PhD students</p>	<p>PhD student presentations based on assigned journal papers</p> <p>Lecturer presentations based on illustrative research projects and papers.</p>