



## COURSE SYLLABUS

### Värdeinnovation

### Value Innovation

7.5 credits (7,5 högskolepoäng)

**Course code:** MT2568

**Main field of study:** Mechanical Engineering

**Disciplinary domain:** Technology

**Education level:** Second cycle

**Specialization:** AIN - Second cycle, has only first cycle course/s as entry requirements

**Subject area:** Mechanical Engineering

**Language of instruction:** English

**Applies from:** 2020-08-31

**Approved:** 2020-03-01

#### 1. Decision

This course is established by Dean 2019-02-27. The course syllabus is approved by Head of Department of Mechanical Engineering 2020-03-01 and applies from 2020-08-31.

#### 2. Entry requirements

Admission to the course requires 150 completed credits of which 60 credits from a MSc Engineering program in Mechanical Engineering or Industrial Economics. In the 60 credits, the courses Analysis I, 6 credits, minimum 6 credits in Product development methodology (Innovative and Sustainable Product Development), minimum 6 credits of Industrial economics (Basic Industrial Economics, 6 credits or Industrial Economics, Overview Course, 6 credits) are included. Additionally requires taken courses in Sustainability Basics (6 credits) and Mathematical Statistics (6 credits).

#### 3. Objective and content

##### 3.1 Objective

Extended product warranties up to 10 years, leasing or pay-per-use schemes are few examples of how manufacturing companies are shifting their focus from selling products to offering 'solutions', by combining products and services to maximize value for their customers. This transformation challenges engineers to work systematically with value creation throughout the entire development process, from the initial need identification stage to detail design. The purpose of the course is to give participants an understanding of value-driven methods for product/service design. The acquired theoretical base is to be applied in real-life projects in collaboration with selected industrial partners.

##### 3.2 Content

The course aims at introducing students to the Design Thinking (DT) methodology framework. DT is an approach for user-centred innovation that has gained increased popularity in the last few decades, both in industry and in the public sector. DT represents a paradigm shift from the traditional linear problem solving approaches, being applied to cope with design situations dominated by ambiguity and lack of knowledge (wicked problems). The four phases of the framework – Initiation, Inspiration, Ideation and Implementation – helps individuals to unleash their innovation potential, and to organize the engineering toolbox when wicked problems are in focus.

The course participants have the chance to apply the acquired theoretical base in 'real-life' development projects conducted in collaboration with selected company partners, both individually and in teams. The regular interaction with stakeholders from industry and society will help students in gathering focused feedback on their learning, and in deepening their reflections on the topic of value innovation.

The course addresses topics such as:

- innovation models and types;
- market and trend analysis;
- methods and tools for need analysis and idea generation
- value and sustainability criteria for concept selection;
- prototyping theory and techniques;
- value and cost modelling tools for design concept selection.

#### 4. Learning outcomes

The following learning outcomes are examined in the course:

##### 4.1 Knowledge and understanding

On completion of the course, the student will be able to:

- reflect on how the development of new solutions (products and services) are organized;
- manage wicked problems in design with a user-centred approach;
- justify the use of methods and tools to support each phase of the innovation process.

##### 4.2 Competence and skills

On completion of the course, the student will be able to:

- categorise and describe target groups and customer types for new products and services;
- analyse customer experience with existing products;
- apply needfinding methods and tools (i.e., interviews and observations) in a relevant environment;
- analyse societal and technological trends, elaborating on their significance for the development of new products and/or services;
- formulate and prioritize the list of needs for innovative products and/or services;
- apply qualitative methods and tools for design concept selection;
- apply quantitative value modelling techniques;
- apply simple prototyping techniques and evaluate the performances of such prototypes;
- work effectively in a team based setting;
- verbally and in writing present and discuss their findings and conclusions, in dialogue with other students.

##### 4.3 Judgement and approach

On completion of the course, the student will be able to:

- explain how chosen methods and tools relate to industrial state-of-practice and academic state-of-the-art;
- critically assess new product development activities with respect to value (desirability, feasibility, viability) and sustainability dimensions (people, planet, profit);
- reflect on their own - and others' - methods, insights and conclusions.

#### 5. Learning activities

The underlying guiding principle of the course is that Design Thinking is learned best through applying it. Hence the course focuses on problem-based learning, with the aim of creating an understanding for how DT can support the design of new products/services, from needs to prototypes.

The course features lectures on design and innovation, which include a mix of short theory reviews (of methods, tools, and strategies for design and innovation) and active work in different group constellations. They are complemented by workshops, tutorials and class exercises that give participants a first-hand experience of the most relevant tools in the DT toolbox. The course project (Project assignment) is conducted in small teams and in collaboration with selected company partners. It stretches over the entire period of study and challenges students to reflect on the implementation of proposed solution concepts both from a technical and business-oriented viewpoint. Experience from the project work are shared during presentation events in the classroom, while peer evaluation and group coaching (feed forward) are used to stimulate critical reflections regarding the process and the results. The course project results are gathered in a written report, which constitutes the basis for grading. The evaluation considers outcomes, process and overall presentation.

Individual written assignments aim at further stimulating students in learning about methods and tools for value innovation, through solving open-ended problems found in trigger material.

#### 6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
2010	Written Assignment	5 credits	AF
2020	Projekt Assignment	2.5 credits	AF

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.

The course-PM for each course revision should include the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

An examiner can, after consulting the Disability Advisor at BTH, decide on a customized examination form for a student with a long-term disability to be provided with an examination equivalent to one given to a student who is not disabled.

**7. Course evaluation**

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

**8. Restrictions regarding degree**

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

**9. Course literature and other materials of instruction**

- Lindstedt, P., Burenus, J. (2006), "The Value Model", Nimba, ISBN 91-630-6349-2.
- Kim, W. C., & Mauborgne, R. A. (2014). Blue Ocean Strategy: expanded edition: How to create uncontested market space and make the competition irrelevant. Harvard Business Review Press. ISBN 9781625274496
- Pedgen, C.D., Sturrock, D.T. (2014) Rapid Modeling Solutions: Introduction to Simulation and Simio. ISBN-10: 1492967130. Available on request at: <https://www.simio.com/about-simio/introduction-to-simio.php>

**10. Additional information**

This course replaces the course MT2554

Översättning/Translation