



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Hållbara tillverkningsystem Sustainable Manufacturing Systems

MMTN31, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED M

Date of Decision: 2023-04-11

General Information

Main field: Production and Materials Engineering.

Compulsory for: MPRR1

Elective for: I4-pr, M4-prr, MD4

Language of instruction: The course will be given in English

Aim

The course aims to create an understanding of the important link between technology and economics, define economic conditions as a tool for production development and provide an idea of how different processing steps and ancillary processes form a manufacturing system. The course also deals with the basic aspects of sustainable production. Furthermore, the course should clarify the mutual dependence between e.g. product development and recycle-adapted manufacturing systems as well as an integrated investment strategy.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- master the fundamental nomenclature of the manufacturing system field and be able to describe the development of and the prerequisites for the manufacturing systems from mass production to the production philosophies of today.
- be able to describe the characteristics of different types of production and layouts.
- master calculation principles for the manufacturing cost of a production section where

all the essential factors are taken into consideration and to have knowledge about different key ratios which describe the performance of the manufacturing system.

- understand the basics of a systematic production analysis and have an understanding of how follow-up and measurement in production can be quantified and the understanding of how key figures are structured and can be used for production development
- have an understanding about the basics of manufacturing economic simulation and be able to establish a plan for production development based on goal functions under given conditions.
- be able to describe the tools and principles for a continuous production development based on the lean production philosophy and Next Step among others.
- have an understanding about the demands that must be made on a manufacturing system regarding environment and recycling aspects.
- have insights and understanding of the fundamental principles of sustainable production and how these can be quantified and interact with product development, investments and environmental and recycle aspects.
- have an understanding about and be able to exemplify important connections between product development, production, and industrial purchase and to have an understanding about the prerequisites and the basic knowledge needed for sustainable products.

Competences and skills

For a passing grade the student must

- be able to analyze and calculate the production capacity of a machine or a production section.
- be able to dimension and configure a manufacturing system with known data and statistically handle different behaviours for example disturbances in a manufacturing system.
- be able to plan, setup and carry out a systematic production analysis including analyses of the achieved results.

Judgement and approach

For a passing grade the student must

- be able to describe and analyze a manufacturing system
- be able to argue for the aspects that are vital for achieving a sustainable production system

Contents

History and development of manufacturing systems, production types, plant layout and organization, group technology, flow lines, transfer lines, flexibility, manufacturing economy including door-to-door time and cycle time in batch manufacturing and flow line manufacturing, process monitoring, cassation, downtime, time loss, reduction in machine covering, cost neutral relationship, configuration of manufacturing systems, statistic disturbance analysis, systematic manufacturing analysis, production performance, continuous development and improvement work based on lean manufacturing, integrated product development with environmental considerations and recycling technology.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written examination and written and oral assignments.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: MMT012/MMTF20 Production and Manufacturing Methods or MMTA05 Production Systems or corresponding.

The number of participants is limited to: No

The course overlaps following course/s: MMTN30, MMT045

Reading list

- Ståhl, Jan-Eric, Windmark Christina: Sustainable Production System, – the link between technology and economy with a global perspective. 2022.

Contact and other information

Course coordinator: Fredrik Schultheiss, fredrik.schultheiss@iprod.lth.se

Teacher: Christina Windmark, christina.windmark@iprod.lth.se

Course homepage: <http://www.iprod.lth.se>