Faculty of Technology and Science
Mechanical and Materials Engineering

Syllabus

**Course Approval**
The syllabus was approved by the Faculty Board of Technology and Science on 5 April 2012 , and is valid from the Spring semester of 2013 at Karlstad University.

**Course Code:** MSGB34
**Production Systems, 7.5 ECTS Credits**
**(Produktionssystem, 7.5 Swedish credit points)**
**Degree Level:** Bachelor
**Progressive Specialisation:** G1F (First cycle, has less than 60 credits in first-cycle course/s as entry requirements)

**Language of Instruction**
Swedish

**Prerequisites**
Mechanical Engineering 45 ECTS cr including mechanics, solid mechanics, materials, engineering design and manufacturing technology, or equivalent

**Major Field of Study**
MTA (Mechanical Engineering)

Learning Outcomes

The course is foundational to the field of production, linking the following areas into a system: sustainability, organisation, layout and flow, production logistics, lean production, production planning, production economy, quality methods and tools. The aim of the course is that students acquire knowledge of these areas and gain a complete perspective on the processes of the production system.

Upon completion of the course, students should be able to:

The production system generally
- give an account of how production can be viewed from a systems perspective,
- give an account of the basic principles of the sustainability of an engineering and production system from environmental, societal and economic perspective.

The management and organisation of the production system
- give an account of the most common forms of the organisation of a manufacturing company,
- give an account of different forms of workshop layout and material flows,
- describe the preparation process in a manufacturing company,
- describe the planning process in a manufacturing company and give an account of central concepts in production logistics and supply chain management,
- give an account of and perform simple production simulation,
- give an account of the concepts Lean Production and Toyota Production System and the most common lean tools.

The economy of the production system
- give an account of the concepts fix costs and variable costs, and direct and indirect costs,
- give an account of calculation models and perform investment and product calculations,
- calculate frozen capital and the value of work in progress (WIP),
- give an account of different profitability concepts and keyperformance indicators and calculate them.

The quality and development of the production system
- give an outline of the central concepts in Total Quality Management,
- give an account of the basics of process and quality management and quality planning,
- give an account of the methods and tools for improvements and control,
- apply the 7 QC tools,
- give an account of the capability concept and calculate process capability.

Content and Form of Instruction

The course starts with a section on the role of industry in society and how production has been organised in a historical perspective. Industrial production and its impact on the environment is treated along with environmental management systems such as ISO 14000. In the section on the management and organisation of the production system the focus is on production processes and layout design with special emphasis on material flows and principles of flow. In logistics, supply chain management, order quantities and material planning are treated. The most common lean tools are included and the theory is illustrated by means of a lean game. Computer exercises in production simulation linked to different flow principles take place. The economy of the production system deals with models for describing a company in economic terms, with a special emphasis on product and investment calculation. Long-term capital investment is discussed in connection with layout and the priciples of flow and planning. Quality assurance is treated in terms of the strategies for improvement such as TQM and Sex sigma. Systematics deals with quality management and quality planning. Special attention is given to the 7 QC tools and process capability. Instruction is in the form of lectures, exercises and case studies.

Reading List

See separate document.

Examination

Assessment is based on a written exam, mandatory laboratory work and hand.in assignments.

Grades

One of the grades U (Fail), 3 (Pass), 4 (Not without Distinction) or 5 (Pass with Distinction) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University stipulate the obligations and rights of students and staff.

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