



Faculty of Health, Science and Technology
Mechanical Engineering

Syllabus

Production Systems I

Course Code:	MSGB49
Course Title:	Production Systems I <i>Produktionssystem I</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:

IEA (Industrial Management)
MTA (Mechanical Engineering)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2024-08-26, and is valid from the Spring semester 2025 at Karlstad University.

Prerequisites

Registered for the Master programme in Industrial Engineering and Management, the Master programme in Mechanical Engineering, the Bachelor programme in Mechanical Engineering, or the Bachelor programme in Innovation and Design Engineering, or equivalent

Learning Outcomes

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

Production systems in general

- give an account of how a production system can be regarded in a systems perspective
- give an account of basic ideas of the sustainability of a production system in terms of environmental, social and economic perspectives.

The control and organisation of the production system

- give an account of the most common forms of organisation for a manufacturing company
- give an account of the various forms of workshop layouts and flow of materials
- describe the production preparation process in a manufacturing company
- give an account of central concepts in production logistics and stock control
- perform simple production simulation
- give an account of key concepts and relevant methods and tools in production strategy and improvement.

The economy of the production system

- give an account of concepts such as fixed and variable cost and direct and indirect cost
- give an account of and perform different forms of product calculation
- calculate capital binding and the value of work in progress (WIP)
- give an account of different concepts of profitability and key performance indicators and their calculation.

The quality and development of the production system

- outline the central concepts in TQM (Total Quality Management)
- give an account of the basic aspects of process and quality management and quality planning
- give an account of methods and tools for improvement and control
- apply methods and tools for production strategy, improvement, and control.

Content

The course is a basic course in the area of production. It links the following subareas into a system: Sustainability, organisation, layout and flow, production logistics, production preparation, production economy, and quality assurance methods. The aim of the course is for students to acquire knowledge of the various components to get a holistic perspective on the processes of a modern production system.

The course starts with a unit on the role of industrial companies in society and how production is organised in an historical perspective. The influence of industry production on the environment is treated.

In the unit The control and organisation of the production system, the production processes and layout design are treated with a special emphasis on material flows and principles of flow. The logistics area includes stock inventory, batch sizing, and materials planning.

The basics of lean production are studied on the basis of values, principles, and methods in Toyota's production system. A laboratory session is carried out in Karlstad Lean factory for a practical example of lean theory. Basic computer exercises focused on production simulation linked to different flow principles are included.

The economy of the production system is treated in terms of models to describe the company in economic terms, especially regarding product calculation. Capital binding is discussed in connection with layout, flow and planning principles.

Improvement strategies are treated in the unit The quality and development of the production system. Systematic improvement is a feature of quality assurance and quality planning.

Instruction is in the form of lectures and practical exercises.

Reading List

See separate document.

Examination

Assessment is individual and based on a written exam, mandatory laboratory sessions, and hand-in assignments.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) 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 evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

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