COURSE SYLLABUS

Simulation in Industrial Engineering, 7.5 credits

Simulering inom industriell ekonomi, 7,5 högskolepoäng

Course Code:	TSEP11	**Education Cycle:**	First-cycle level
Confirmed by:	Dean Mar 1, 2021	**Disciplinary domain:**	Technology (75%) and social sciences (25%)
Revised by:	Director of Education Jun 28, 2022	**Subject group:**	IE1
Valid From:	Aug 1, 2022	**Specialised in:**	G2F
Version:	2	**Main field of study:**	Industrial Engineering and Management

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- Show familiarity with the fundamental principles and characteristics of discrete-event system simulation.
- Display comprehension of the steps in a discrete-event simulation study.

Skills and abilities

- Demonstrate skills of planning and formulating discrete-event simulation models of industrial systems.
- Demonstrate the ability to execute discrete-event simulation models using a software.

Judgement and approach

- Demonstrate the ability to analyze, interpret and communicate the results of discrete-event simulation models.
- Demonstrate an understanding of the application of discrete-event simulation in industrial engineering and management, and its implications for sustainability.

Contents

General:
Discrete event simulation is an analysis method for system analysis in most areas of Industrial Engineering where processes are controlled by time-discrete start and stop events. Discrete event simulation can capture complex systems and analyze long time periods in the system in a very short real time. The method of analysis has been shown to be very powerful in the analysis of stochastic systems. The course limits its applications to production and logistics. In production, the effects of setup times, lot sizes, process times and capacity are analyzed. In logistics, the effects of transport times, inventory availability and cost calculations are analyzed. The course provides competence and experience to carry out your own simulation studies.

Contents:
The course contains basic knowledge in the subject area of discrete event simulation in Industrial Engineering, mainly in the simulation for analysis of production and logistics systems. The course focuses on step-by-step methodology for simulation studies and methods used in simulation.
The course includes:
• Basic concepts in discrete event-driven simulation
• Simulation methodology, steps in a simulation study.
• Input modeling.
• Verification and validation of simulation models.
• Experimental planning and output analysis.
• Modeling in a commercial simulation software.
• The use of simulation. Simulation of production and logistics systems.
The examples used in the course and in the examination are linked to applications in Industrial Engineering. The course provides practical experience in modelling in Industrial Engineering linked with theory for in-depth simulation analysis.

Type of instruction

Lectures, Seminars, and Laboratories

The teaching is conducted in English.

Prerequisites

General entry requirements and completed courses comprising 60 credits in first cycle including Mathematical Statistics, 7,5 credits

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Laboratory work	1.5 credits	U/G
Project	4 credits	5/4/3/U
Assignments	2 credits	5/4/3/U

Course literature

The literature list for the course will be provided 8 weeks before the course starts.

The course book is:
Robinson, S. (2014) Simulation - The Practice of Model Development and Use, Palgrave Macmillan, 2nd Ed.

Artiklar:
Banks, J., J. S. Carson, B. L. Nelson, and D. M. Nicol. 2000. Discrete-Event System Simulation. 3rd ed. Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Persson, F. (2003) Supply chain simulation: Experiences from two case studies, 15th European Simulation Symposium, Delft, The Netherlands (October)
Robinson, S. (2008) Conceptual modelling for simulation Part I: Definition and requirements, in Journal of the Operational Research Society 59(3):278-290.
Robinson, S. (2008) Conceptual modelling for simulation Part II: A framework for conceptual modelling, in Journal of the Operational Research Society 59(3):291-304.
Steins, K. and Persson, F. (2015) Identifying Factors for Successful Implementation of Simulation Modeling in Healthcare, International Journal of Privacy and Health Information Management, 3(1), 1-19, January-June 2015.