



KURSPLAN

Produktionsutveckling II - virtuella verktyg och modellering, 7,5 högskolepoäng

Production Development II - Virtual Tools and Modelling, 7.5 credits

Kurskod:	TPVS22	Utbildningsnivå:	Avancerad nivå
Fastställd av:	VD 2021-03-01	Utbildningsområde:	Tekniska området
Reviderad av:	Utbildningschef 2021-10-22	Ämnesgrupp:	MT1
Gäller fr.o.m.:	2022-01-01	Fördjupning:	A1F
Version:	2	Huvudområde:	Produktionssystem

Lärandemål

After a successful course, the student shall

Kunskap och förståelse

- display knowledge of the concept of productivity and its underlying factors
- demonstrate comprehension of how production systems are realized and deployed
- demonstrate comprehension of methods and tools for system modelling, design and analysis
- demonstrate comprehension of the role of maintenance management to enhance productivity

Färdighet och förmåga

- demonstrate skills of applying different modelling tools for the design and improvement of production systems
- demonstrate skills of applying basic multi-objective optimization for production system development

Värderingsförmåga och förhållningssätt

- demonstrate the ability to evaluate various production system designs
- demonstrate the ability to evaluate the effect of different maintenance strategies to production performance.

Innehåll

The course is a natural follow up to Production Development I - Strategy and System. It deals with methods and tools to support production system modelling, design and analysis using virtual tools. The concept of productivity and its various components are at the core of the course. The aim is to increase productivity through a better design of production systems during its operational phase. Much focus is on using discrete-event simulation to its support. The strategic development of maintenance to support productivity is also studied, using also systems thinking modelling. Some insights into optimization techniques for experimenting, analyzing and verifying simulation models is also gained. An important part of the course is an industrial project, where the students' newly gained skills and understanding are expected to become manifested. In the seminars we reflect upon our learnings and share our new experiences with

each other.

The course includes the following elements:

- Evaluation of production performance and productivity
- Analysis and implementation of production strategies
- Design of production systems, which can include sustainability and maintenance, production philosophies, layout and organizational solutions
- Flow simulation and other tools for system design
- Time studies, balancing and flow optimization
- The connection between maintenance operations and production operations
- Key performance indicators in maintenance, and their corresponding effect to drive behavior in maintenance and the relation to short- and long-term effects on productivity
- Reactive and proactive maintenance and production development

Undervisningsformer

Lectures, seminars, exercises and project work.

Undervisningen bedrivs på engelska.

Förkunskapskrav

Passed courses at least 90 credits within the major subject in Mechanical Engineering, Industrial Engineering and Management or Civil Engineering, and 15 credits Mathematics, and completed courses Production Development I - Strategy and System 7,5 credits and Integrated Product and Production Development 7,5 credits. Proof of English proficiency is required (eller motsvarande kunskaper).

Examination och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Inlämningsuppgifter ¹	3,5 hp	5/4/3/U
Projekt	3 hp	U/G
Seminarier	1 hp	U/G

¹ Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

Kurslitteratur

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

Title: Discrete-Event simulation and System Dynamics for Management Decision Making

Author: Brailsford, S., Churilov, L., Dangerfield, B. eds.

Publisher: John Wiley & Sons.

ISBN: 9781118349021

Reference literature

Title: Beyond World-Class Productivity: Industrial Engineering Practice and Theory

Author: Shigeyasu Sakamoto

Publisher: Springer

ISBN: 978-1-84996-268-1

Title: Uptime: Strategies for Excellence in Maintenance Management

Author: John D. Campbell, James V. Reyes-Picknell, Hyung Sik Kim

Publisher: CRC Press Taylor & Francis Group

ISBN: 978-1-4822-5237-8

Title: Simulation the practice of model development and use

Author: Stewart Robinson

Publisher: Palgrave MacMillan

ISBN: 9781137328021

Title: Discrete-event system simulation

Author: Banks, J., Carson II, J. S., Nelson, B. L. & Nicol, D. M.

Publisher: Pearson Education Limited

ISBN: 9780136062127

Title: Business dynamics: systems thinking and modeling for a complex world Boston

Author: Sterman, John D

Publisher: Irwin/McGraw-Hill

ISBN: 0072311355