Masterprogrammet
Sustainable Production Development
TITHM

2019-04-10
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Education and Research at KTH Södertälje

Research environment for Sustainable Production Development
Production management – Production logistics – Industrial dependability

Graduate studies (140 ECTS for PhD)
Industrial economics and management / Production engineering

MSc (Civilingenjör)
Industrial technology and sustainability (five years)

International MSc Sustainable Production Development

Logistics

BSc (in Swedish)
Mechanical engineering + Teacher exam mathematics/ engineering 7-9

2019

2016

MSc

2018

2017

BSc (in Swedish)
Industrial Engineering and Maintenance

BSc (in Swedish)
Industrial Engineering and Production - Innovation and Design

BSc (in Swedish)
Mechanical Engineering + Teacher exam mathematics/ engineering 7-9

BSc (In Swedish)
Industrial Engineering and Production - Innovation and Design

2019

Lean centre
Lean production and Lean management

Tekniskt basår / bastermin
Information on the master’s programme

- Content of courses
- Resources

Master’s program Sustainable Production Development (TITHM)

- Focusing the renewal of industrial production
  - Sustainable production
  - Digitalisation of production
- Classes in English
- Södertälje-situated (core)
- National and International recruitment

- Three dimensions of sustainable production:
  - Production management
  - Production logistics
  - Industrial dependability
- Close industrial collaboration
- Close research collaboration
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<td>ML2302 Modelling, simulation and optimization of production systems, 9.0 h</td>
<td>ML2303 Digitalisation for sustainable production, 9.0 hp</td>
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**TITHM - Year 1**

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Sustainable Production Development
TITHM - Year 2

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<td>CDIO project in production systems and sustainability, 15.0 hp</td>
<td>Elective course, 9.0 hp</td>
<td>Master’s thesis in Sustainable Production Development, 30 hp</td>
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<td>Research methodology and methods, 6.0 hp</td>
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Entry requirements

- English language proficiency equivalent to (the Swedish upper secondary school) English course B/6 is required.
- A bachelor of Science in Engineering, corresponding to at least 180 ECTS credits, or equivalent degree, with a specialisation in one of the following fields: mechanical engineering, industrial engineering, supply chain management, industrial management, design and product development, vehicle engineering, sustainable development, information and communication technology, computer science and engineering, or corresponding field.
- A basic course in industrial engineering including systems engineering, production systems and operations management, is required to fulfil the specific requirements.
Course prerequisites

ML1503 *

ML2300 Sustainable production, 9.0 hp
ML2301 Production management and development, 9.0 hp
ML2302 Modelling, simulation and optimization of production systems, 9.0 h
ML2303 Digitalisation for sustainable production, 9.0 hp

ML2306 Industrial analytics for advanced manufacturing, 6.0 hp
ML2305 Production logistics and supply chains, 6.0 hp
Elective course, 6.0 h
ML2304 Sustainable development in industry

Elective course, 6.0 h
ML1502 *

(*) Or equivalent

What to work with as a MSc?

- Examples..

Developing new production technology or systems/factory
- Developing the smart factory – Industry 4.0
- Engineer, Expert
- In Sweden or globally

Working in, or managing operations
- Operating or supporting the production cell/line
- Lean production.
- Manager for – production teams – or factory – or group of factories

Production logistics – supply chain, sourcing, planning etc.

Expanding in other functions:
- Purchasing, market & sales, project management, new product development, industrializing new products, investment projects, sustainability, SHE-department etc. etc.

PhD student within production
- Focus on your area of interest, learn more, develop new knowledge, join the "knowledge business"

And much more…
ML2300 Sustainable Production
(Hållbar produktion), 9 Hp

Course main content
The course includes for example following main subjects:
- Dynamics in value creation and sustainability
- Theory and practice of sustainable production
- Planning, operation and evaluation of sustainable production system
- Environmentally conscious process design
- Relation between the product, the production and the supply chains for sustainable production
- Selected subjects in sustainable production
  - Production Management for sustainable Production
  - The role of logistics in sustainable production
  - Industrial operational reliability and robustness for sustainable production
  - The relation between production and circular economy

Behörighet
Slutförd kurs ML1503 Industriella system, 6hp eller motsvarande
Slutförd kurs Kandidatexamenarbete, 15 hp eller motsvarande.

Examination
TEN1, Skriftlig tentamen/Written exam, 3 hp, A-F
INL1, Inlämningsuppgift/Assignment, 3 hp, A-F
ÖVN1, Övningsuppgifter/Exercises, 3 hp, P/F
ML2306 Industrial Analytics for Advanced Manufacturing  
(Industriell analys för avancerad tillverkning), 6hp

Course main content
- The course deals with advanced production, with a focus on intelligent production equipment and metrology as integrated parts of production systems for manufacturing of components
- A review of industrial robots and machine tools, their configurations, sub-systems, design and operational ability
- Characterisation, simulation, supervision, methods for diagnostics and prognostics of machines, as well as tools for identification of improvement possibilities
- Teaches on how to acquire and apply new knowledge through three primary learning activities: design, carry out and document individual research

Behörighet
- Slutförd kurs ML1503 Industriella system, 6 hp eller motsvarande.
- Slutförd kurs Kandidatexamenarbete, 15 hp eller motsvarande.

Examination
- TEN1, Skriftlig tentamen/Written exam, 4 hp, A-F
- INL1, Inlämningsuppgift/ assignment, 1 hp, P/F
- LAB1, Laborationer/ Laboratory work, 1 hp, P/F

P1 P2 P3 P4
ML2300 ML2301 ML2302 ML2303
ML2306 ML2305 (ML2304) Elective

ML2301 Production Management and Development  
(Produktionsledning och produktionsutveckling) 9hp

Course main content
- Aim: understanding and knowledge of production management in the development and operational phases
- Important subareas and issues in the area of production management; methods and models used to lead and control industrial production activities
- Highlights the importance of the production organisation for development and operation of production system
- Management of incremental and radical changes, including specification and purchase of production equipment
- Understanding and impacting production sustainability in both developmental and operational phases

Behörighet
- Slutförd kurs ML1503 Industriella system II, 6 hp eller motsvarande.
- Slutförd kurs Kandidatexamenarbete, 15 hp eller motsvarande.

Examination
- TEN1, Skriftlig tentamen / Written exam, 4 hp, A-F
- INL1, Projektarbete i grupp / Assignment, 5 hp, A-F

P1 P2 P3 P4
ML2300 ML2301 ML2302 ML2303
ML2306 ML2305 (ML2304) Elective
### ML2305 Production Logistics and Supply Chains
(Produktionslogistik och försörjningssystem), 9hp

**Course main content**
- Understanding of and tools for supply chain management in technology intensive sectors
- How these theories and tools can be applied in service producing supply chains
- Provide advanced knowledge of how technical solutions can improve material and information flows in internal productions logistics, transport and storage systems, as well as in SCM (including intermodal transports)
- A basis for critical analysis of ethical, safety and integrity challenges in layers and transport systems as well as interaction between man and automated equipment

**Behörighet**
- Slutförd kurs ML1503 Industriella system II, 6 hp, eller motsvarande.
- Slutförd kurs Kandidatexamensarbete, 15 hp eller motsvarande.

**Examination**
- TEN1, Skriftlig tentamen/ Written exam, 3 hp, A-F
- PRO1/ Projektuppgift/ Project work, 3 hp, A-F

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### ML2302 Modelling, Simulation and Optimization of Sustainable Production, 9hp
(Modellering, simulerings och optimering av hållbar produktion)

**Course main content**
- Methods to analyse typical problems in resource and flow efficiency for production and logistic
- Laboratory sessions and understanding of different softwares to simulate resource and flow efficiency for production and logistics
- Design, verification and validation of simulation models as well as experimental analyses
- Students are trained to reflect on difficulties experienced during the different stages of a simulation study and which requirements are requested for implementation
- Creates basis for the analysis of environmental and social positions at modelling simulation and optimisation of production and logistics

**Behörighet**
- Slutförd kurs SF1811 Optimeringslära, 6 hp, eller motsvarande.
- Slutförd kurs ML1018 Grundläggande industriell statistik, 6 hp, eller motsvarande.
- Slutförd kurs ML1503 Industriella system II, 6 hp eller motsvarande.
- Slutförd kurs Kandidatexamensarbete, 15 hp eller motsvarande.

**Examination**
- INL1, Inlämningsuppgift/ Assignment, 3 hp, A-F
- LAB1, Laborationer/ Laboratory work, 2 hp, P/F
- PRO1, Projektuppgift/ Project work, 4 hp, A-F

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ML2304 Sustainable Development in Industry
(Hållbar utveckling i industriell verksamhet), 6hp

Course main content
- Is based on material and energy flow analysis, cleaner production, circular economy, industrial ecology and sustainability handling
- the input and output flow of material and energy for individual industrial producers as well as for larger industrial systems and networks
- How physical flows are connected to strategic, organisational and management studies and methods, to understand the three dimensions of sustainability: economical, environmental and social, and how they are manifested in industrial companies and industrial systems

Examination
- TEN1, Skriftlig tentamen/Written exam, 3 hp, A-F
- INL1, Inlämningsuppgift/Assignment, 3 hp, P/F

ML2303 Digitalisation for Sustainable Production
(Digitalisering för hållbar produktion), 9 hp

Course main content
- To teach students to link the increasing digitisation in industrial production with stakeholders, roles, practice and future development of the operations
- The course prepare students for work tasks as providers or purchasers of solutions in the fast growing field of Industry 4.0.
- To learn about a number of important technologies and tools to collect, store, analyse and visualise data for applications in production and logistics
- Understanding of how an increased digitisation can be realised, and its possibilities to contribute to a more sustainable production as well as an increased servitization and business development
- Will form a basis for critical analysis of ethical, safety and integrity challenges with an increased digitalisation of production

Examination
- TEN1, Skriftlig tentamen/Written exam, 4 hp, A-F
- INL1, Inlämningsuppgift/Assignment, 5 hp, A-F