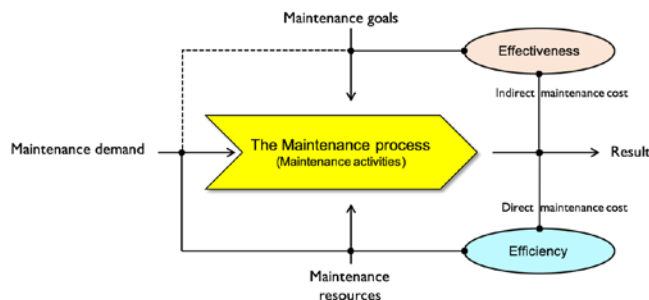


Course syllabus for

P52: Maintenance of Industrial Equipment

Syllabus adopted 2019-09-11 by Professor Bengt-Göran Rosén, Produktion2030 Head of Education



Credits	4 hec
Grading scale	Satisfactory/not satisfactory
Education cycle	Third-cycle
Examiner	Senior Lecturer Antti Salonen, Mälardalen University
Eligibility	A Master's degree in production engineering or equivalent
Aim	The course aims to increase awareness regarding industrial maintenance and its importance for the digital transformation of the manufacturing industry.
Intended learning outcomes	<p>After completion of the course the course participant should be able to</p> <ul style="list-style-type: none"> • Describe the basic principles and terminology of industrial maintenance. • Argue for the value of industrial maintenance • Describe how to measure maintenance performance • Describe effective and efficient maintenance management principles, e.g. TPM • Exemplify how advanced data analytics can be used for maintenance decisions • Describe the concept of smart maintenance

- Classify production disturbances and relate them to maintenance activities
- Exemplify how industrial maintenance is managed in industrial settings
- Describe how maintenance is related to circular economy and product design
- Apply basic techniques for condition-based maintenance
- Argue for what aspects of maintenance to include in the requirement specification of production equipment
- Describe how product quality relate to machine capability and maintenance
- Scope and position their own research/profession in relation to industrial maintenance

Course content

The course will address a broad perspective of industrial maintenance, focusing on production equipment. The core area of work for each PhD student will be their own research domain while reflecting on how these domains relate to the maintenance domain. By gaining insights into the domain of industrial maintenance, the PhD students will deepen their understanding of the maintenance implications within their field.

Course organisation

Four physical meetings are planned (lunch to lunch), in addition to work in-between the meetings.

The first physical meeting is initiated with a short round table to let each person introduce themselves, their research area, and how it relates to the area of maintenance.

Lecture/seminar on the following subjects:

- The basic concept of maintenance and dependability
- The value of maintenance and corresponding measures
- Lean maintenance/maintenance related waste
- Total productive maintenance
- Autonomous maintenance

Industrial study visit.

Task for 2nd meeting: How your research influence/is influenced by effective maintenance

The second physical meeting is initiated with presentation/discussion of assignments.

Lecture/seminar on the following subjects:

- Smart maintenance
- Data driven decision making in maintenance
- Flow based maintenance (Criticality)
- Disturbances in production systems
- The state of Swedish maintenance research

Industrial study visit.

Task for 3rd meeting: How the digitalization of maintenance and maintenance decisions relates to your research

The third physical meeting is initiated with presentation/discussion of assignments.

Lecture/seminar on the following subjects:

- Design for maintenance
- The role of maintenance in circular production systems
- Sensors and measurement systems for advanced machinery
- Advanced machinery – machine tools and industrial robots
- Machine capability, related to product quality and maintenance

In the fourth physical meeting all students present their short papers and discuss the relations between industrial maintenance and their own research.

Examination

A successful completion of this course will be judged on the following:

- actively partaking on all four meetings
- hand-in of tasks
- demonstration of mature reflection on their own relation to maintenance research

Literature

Course literature will be decided and made available to participants at course start.