1. Department of Industrial Engineering and Management

Department of Industrial Engineering and Management
P.O. Box 4610, 90014 UNIVERSITY OF OULU, phone +358 8 553 1011
Department’s office open 8 am – 3:45 pm, phone +358 8 553 2936, fax +358 8 553 2904.
Department’s homepage: www.tuta.oulu.fi/in-english
Faculty homepage: www.ttk.oulu.fi

1.1. Department of Industrial Engineering and Management

The Department of Industrial Engineering and Management is a part of the Faculty of Technology. The Department is divided into three research and teaching units: Industrial Management, Quality and Project Management, and Work Sciences.

Department is responsible of degree Programme in Industrial Engineering and Management. Bachelor level studies are in Finnish. Master’s level studies are partly in English: all the courses in the minor in Technology Management are possible to carry out in English. Students who apply based on international Bachelor degree are strongly recommended to choose minor in technology Management.

1.2. Personnel at the department

Information concerning personnel working at the department can be found from department’s homepage www.tuta.oulu.fi.

All persons have email addresses which are like following: firstname.lastname@oulu.fi

Head of the department:

KESS, Pekka, professor, phone +358 8 553 2932

Office:

LUMIJÄRVI, Marita, departmental secretary, phone +358 8 553 2936

Study adviser:

VÄÄNÄNEN, Mirja, phone +358 8 553 2933

1.3. Guidelines for students

Bulletin board

Department’s bulletin board is located at the T-corridor. Important information can be found also from department’s home pages. Information concerning other departments’ courses can be found from their bulletin board.

Library

Literature for courses offered by the department can be found from main library. Other relevant literature can be found also from Tellus library.
Exams

For the courses that have exams, there will be at least three exams. In general, the exams will be on Wednesdays 2pm – 6pm. Students are required to assign to the exams by the latest on the Monday before the exam. Assigning to the exams can be done in WebOodi https://weboodi.oulu.fi/

Student advising

Student advising is responsibility of student advisor. For every student starting at the degree program there will be also tutor teacher and tutor student. Also course teachers are happy to answer any questions related to studies at the department.

Courses from other departments and faculties

Degree program of Industrial Engineering and Management includes studies from other departments and faculties. Course schedules and other relevant information related to them can be found from the homepages of each department/faculty.

Exchange studies

The department has student exchange cooperation with many foreign universities. Students are encouraged to study abroad some proportion of the degree studies.

Teaching timetable

Teaching is organized into six teaching periods. The teaching periods for study year 2010-2011 are as following:
1. 6.9. – 8.10.
2. 11.10. – 12.11.
3. 15.11. – 17.12.
4. 10.1. – 11.2.
5. 14.2. – 25.3.
6. 28.3. – 6.5.

Graduation

Information related to graduation will be found from department’s homepages, office and student advisor.

Work group for developing education at the department

The department has active work group for developing education at the department (OKTR). OKTR aims to enhance communication between the students and the department. During the study year, OKTR has meetings regularly about once a month. OKTR welcomes every student and faculty member to join the meetings.

1.4. Degree programme in Industrial Engineering and management

1.4.1. Bachelor’s degree

During the first three years students typically earn their Bachelor’s Degree. The studies give comprehensive basis for the Master’s Degree studies, and capabilities to work in basic level tasks in the field of industrial engineering and management. The bachelor’s degree consists of basic studies in mathematics and natural sciences, intermediate studies in industrial engineering and management, and technical minor studies that the students can choose from other engineering departments at the faculty.

The number language courses is limited: there can be only 18 ECTS language courses in the bachelor’s and master’s degrees altogether.

1.4.2. Master’s degree

The fourth and fifth year of the programme consist of studies aiming at Master’s Degree. During the Master’s degree studies, the students can choose from four minor subjects specialising in different fields of industrial engineering and management. In addition, during the master’s degree studies, the students continue their technical studies, already started during the bachelor degree.
M.Sc. (Eng.) in Industrial Engineering and Management has wide based knowledge over engineering sciences, business economics and human sciences. This includes knowledge over related terminologies and theories that can be utilised generally for enhancing productivity and wellbeing. M.Sc. (Eng.) in Industrial Engineering and Management is capable of applying the gained knowledge for solving challenges relating to innovation and production activities in all areas of economic life.

The number language courses are limited: there can be only 18 ECTS language courses in the bachelor’s and master’s degrees altogether.

1.4.3. Degree structure and contents

Master’s degree, 120 ECTS, 2 study years

<table>
<thead>
<tr>
<th></th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s thesis</td>
<td>30</td>
</tr>
<tr>
<td>Technical studies</td>
<td>20</td>
</tr>
<tr>
<td>Elective studies</td>
<td>10</td>
</tr>
<tr>
<td>Minor modules</td>
<td>60</td>
</tr>
</tbody>
</table>

The Master’s degree must contain at least 120 ECTS.
Minor studies
Master’s degree includes 60 ECTS minor studies that aim to educate engineers to have necessary skills and capabilities for analysing, planning and developing technologies. After completing the minor, the student will have readiness to operate especially in product development projects, but also in various functions of different development activities. Specialisation is based on a strong technoscientific teaching, and occurs also aside teaching. Strong basis for specialisation is created through studying product technologies, product development, managing innovation process, measuring performance, and management information systems. Other study modules in Industrial Engineering and Management complement the core content of minor in Technology Management.

Advanced practical training
Minor studies at masters’ degrees include 3 ECTS (2 months) advanced practical training. Instructions for completing training will be found from the department’s homepage www.tuta.oulu.fi/in-english

Technical studies
Master’s degree includes at least 20 ECTS technical studies that the student can choose from Department of Process And Environmental Engineering or from Department of Electrical and Information Engineering. Technical studies are planned together with the student advisor.

Elective studies
Master level studies include maximum 10 ECTS elective studies. Students choose courses that supplement or deepen the competencies of Industrial Engineering and Management. Courses with same content cannot be included twice to the degree.

Master’s thesis
The purpose is of the master’s thesis is to deepen student’s understanding on selected area(s) of Industrial Engineering and Management. The master thesis project takes about 6 to 8 months and is usually conducted for purposes of a company. Students are responsible to suggesting interesting thesis topic for advising professor.

1.4.4. Curriculum for master level students starting fall 2010
This chapter presents curriculum for students who are starting fall 2010 and whose bachelor’s degree are from foreign countries.

MINOR MODULES
TECHNOLOGY MANAGEMENT

Compulsory module, 28 ECTS

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Periods</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>555240A Basic course in product development</td>
<td>3</td>
<td>1-3</td>
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<tr>
<td>555320S Strategic management</td>
<td>5</td>
<td>1-3</td>
</tr>
<tr>
<td>555321S Risk management</td>
<td>3</td>
<td>1-3</td>
</tr>
<tr>
<td>555340S Technology management</td>
<td>4</td>
<td>1-3</td>
</tr>
<tr>
<td>555360S Administration, organization and education in working life</td>
<td>5</td>
<td>4-6</td>
</tr>
<tr>
<td>555324S Production management</td>
<td>3</td>
<td>4-6</td>
</tr>
<tr>
<td>555380S Quality management</td>
<td>5</td>
<td>5-6</td>
</tr>
</tbody>
</table>
**Advanced special studies**

Students can choose from the following courses at least 32 ECTS.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>ECTS</th>
<th>Periods</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>555341S</td>
<td>Productivity and performance management</td>
<td>3</td>
<td>4-6</td>
<td>4</td>
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<tr>
<td>555343S</td>
<td>Product Data Management</td>
<td>3</td>
<td>1-3</td>
<td>4</td>
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<tr>
<td>555344S</td>
<td>Management Information Systems</td>
<td>4</td>
<td>4-6</td>
<td>4</td>
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<tr>
<td>555365S</td>
<td>Computer-aided methods in ergonomics</td>
<td>3-6</td>
<td>4-6</td>
<td>4</td>
</tr>
<tr>
<td>555345S</td>
<td>Advanced course in product development</td>
<td>6</td>
<td>1-3</td>
<td>5</td>
</tr>
<tr>
<td>555346S</td>
<td>Advanced course in technology management</td>
<td>5</td>
<td>1-3</td>
<td>5</td>
</tr>
<tr>
<td>555347S</td>
<td>Seminar in technology management</td>
<td>5</td>
<td>1-3</td>
<td>5</td>
</tr>
<tr>
<td>555348S</td>
<td>Research project in technology management</td>
<td>5</td>
<td>1-6</td>
<td>5</td>
</tr>
</tbody>
</table>

**TECHNICAL STUDIES**

Students take 20 ECTS from either Department of Process And Environmental Engineering OR from Department of Electrical and Information Engineering.

**Studies from Department of Electrical and Information Engineering**

Based on students’ previous technical knowledge, students can choose their 20 ECTS from the courses that the department offers in English. Students present their study plan to study advisor to agree.

**Studies from Department of Process and Environmental Engineering**

Based on students’ previous technical knowledge, students can choose their 20 ECTS from the courses that the department offers in English. Students present their study plan to study advisor to agree.
1.5. Courses

555240A Basic course in product development
Scope: 3 ECTS
Timing: Autumn
Objectives: This study module introduces product development, innovations and technology management in a company environment. Basic course in product development provides fundamental understanding over tools and frameworks that can be used for analysing and managing products, innovations, and technology development. The aim is to create a connection between product development and other company functions.
Learning outcomes: After this study module, a student is capable of explaining the role of product development as a company function. The student understands the difference between innovation activities and systematic product development, and knows the difference between different phases of product development process and its activities. Additionally, the student is able to define the meaning of other company functions to product development activities.
Contents: Meaning of products for the operations of an industrial enterprise. Product development paradigm and defining relevant concepts. Realising product development methodologically (Cooper’s stage-gate model, QFD), managing innovations, and product development success factors.
Working methods: The course includes lectures and compulsory course work. The course work entails simulating product development in practical situations.
Target group:
Prerequisites: None
Assessment methods: Final exam.
Grading: 1-5/fail
Responsible person: Harri Haapasalo
Other information: Language of instruction: Finnish

555320S Strategic management
Scope: 5 ECTS
Timing: Autumn
Objectives: The aim of the course is to familiarize a student with strategic thinking, business strategy development as well as the processes, methods, and tools involved with the management of change, in both theory and practice. 
Learning outcomes: After completing the course student knows the key concepts of strategic thinking, strategic management and strategic planning and can explain these. The student can describe structures and can explain the importance of the strategic management to organisations. The student can analyse strategic management in companies and can produce improvement proposals based on the analysis. After the course the student can take part in strategic planning in organisations.
Working methods:
Target group:
**555321S Risk management**

**Scope:** 3 ECTS  
**Timing:** Autumn  
**Objectives:** The course familiarizes a student with the overall concept of risk management. During the course we cover the classification of risks in business and the different methods of risk management.

**Learning outcomes:** After completing the course student knows the key concepts of risk and risk management and can explain these. The student can describe risk classifications and can explain the importance of the risk management to organisations. The student can analyse business risks from new point of view and can produce improvement proposals based on the risk analysis. After the course the student can take part in the organisational development in a role of an expert in the area of risk management.


**Working methods:**

**Target group:**

**Prerequisites:**

**Study materials:**

**Assessment methods:**

**Grading:**

**Responsible person:** Pekka Kess

**Other information:**

**Language of instruction:** English

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**555340S Technology management**

**Scope:** 4 ECTS  
**Timing:** Autumn  
**Objectives:** The aim of the course is to highlight the significance of technology from the perspective of competition. To present the speed of technological development and the effects that the scope of technology has on the operations of a productive firm. To create a basis for understanding the meaning of innovation. To create a link between organization strategy and technological strategy.

**Learning outcomes:** After finishing the course, the student will able to differentiate product development and technology management in a company. The student will be able to piece together the development needs and cycles of technologies in an organization. In addition, the student will know how to combine technology development and technology management with strategic planning of a company.

**Contents:** The course consists of defining technology and its role within an enterprise and within society. During the course we study the meaning of innovation in technological competition. The lifecycles of technology including development, acquisition, and movement are also covered.

**Working methods:**

**Target group:**

**Prerequisites:**

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TUTA 7
555360S Administration, organization and education in working life
Scope: 5 ECTS
Timing: Spring
Objectives: To deal with the themes of organization theory, administration, supervision, education and human resources in working life.
Learning outcomes: After the course the student has an understanding of different organizations and how to work in organizations.
Working methods:
Target group:
Prerequisites:
Study materials:
Assessment methods:
Grading:
Responsible person: Harri Haapasalo
Other information:
Language of instruction: English

555324S Production management
Scope: 3 ECTS
Timing: Spring
Objectives: The aim of this course is to reach understanding of the role of the principles of production management at operational, tactical and strategic level.
Learning outcomes: After finishing this course, the student will be able to analyze production processes and to define the cornerstones of managing different production modes. In addition the student will know how to analyze the bottlenecks in different production processes. By combining this and previous courses, the student will be able to define the most important development areas in production processes.
Working methods:
Target group:
Prerequisites:
Study materials:
Assessment methods:
Grading:
555380S Quality management
Scope: 5 ECTS
Timing: Spring
Objectives: The course gives the student a broad conceptions of contents of total quality management and applying it in different environments.
Learning outcomes: Having completed the course, the student can analyze the central principles and contents of quality management and related management approaches. The student can apply the learned things and methods in different kinds of situations and industries.
Contents: Quality management and its basic assumptions, the methods of TQM in different environments, quality systems, quality award competitions, process management, performance measurement, organisational capability models.
Working methods: Lectures, lecture pre-exercises, group study and presentation. Grade is derived from group study, presentation and a final exam.
Target group:
Prerequisites:
Study materials: Lecture materials, course readings.
Assessment methods:
Grading:
Responsible person: Harri Haapasalo
Other information:
Language of instruction: English

555341S Productivity and performance management
Scope: 3 ECTS
Timing: Spring
Objectives: The course familiarizes a student with the concepts of productivity and performance, with meters, and with the relationships between productivity and the different sectors of an enterprise. It also covers the evaluation of a firm’s internal performance and the financial effects of developing productivity.
Learning outcomes: After finishing the course, the student will be able to analyze the efficiency of activities in an organization, from both internal and external viewpoints. The internal analysis is based on Balanced Score Card or other equivalent performance measurement. External measurement of efficiency is based on analyzing productivity development and the factors affecting it.
Contents: The concepts of productivity and performance and the levels to their examination. Productivity and it’s significance to an enterprise’s processes and profitability. Measuring productivity and performance. The meters of productivity and operative steering tools. An enterprise’s internal and external productivity. The analysis and the tools for analysis of productivity and the approaches for measuring productivity in industry.
Working methods:
Target group:
Prerequisites:
Study materials:
Assessment methods:
Grading:
Responsible person: Harri Haapasalo
Other information:
Language of instruction: English

555343S Product Data Management
Scope: 3 ECTS
Timing: Fall
Objectives: The course familiarizes a student with the product processes of an enterprise. The course also covers the methods and systems that are used to control information related to products, and to manage production as well as usage during the product’s entire lifecycle.
Learning outcomes: After finishing the course, the student will be able to analyze existing and future products from product structure viewpoint and to build the basis for a data system needed to manage product data.
Contents: Product information management concepts, its history and challenges. PDM-processes: managing product models, managing specific products, managing nomenclature, managing documents and configurations as well as tracing information. PDM-system and its functions. PDM-project and implementation of the system. Product and control systems integration.
Working methods:
Target group:
Prerequisites:
Study materials:
Assessment methods:
Grading:
Responsible person: Harri Haapasalo
Other information:
Language of instruction: English

555344S Management Information Systems
Scope: 4 ECTS
Timing: Spring
Objectives: The aim of the course is to provide readiness for enterprise information system designing, purchasing, and development tasks. The aim is to familiarize a student with the significance of information and its management when controlling processes.
Learning outcomes: After completing the course student knows the key concepts of management information systems and can explain these. The student can define the information needs of management processes and how information systems can meet these needs. The student can describe the key features of the following types of systems: DSS, GDSS, EIS, BI, and ERP. The student can analyse the state of the management in an organisation, and can suggest a suitable type of information system to support the management. After the course the student can take part in the organisational development from MIS points of view.
Contents: The main content is based on exploiting information systems in decision making and leadership. The following topics are covered during the course; Decision Support Systems (DSS), Group Support Systems (GSS), and Executive Information Systems (EIS). Also covered are the effects of information technology in operations, examining the effects of information and communication technology on productivity, financial growth, and the formation of national competitiveness.
Working methods:
Target group:
Prerequisites:
Study materials:
Assessment methods:
Grading:
Responsible person: Pekka Kess
555365S Computer-aided methods in ergonomics
Scope: 3-6 ECTS
Timing: Spring
Objectives: The course familiarizes the student with some of the internationally well-known pieces of CAD-software for ergonomics design and evaluation.
Learning outcomes: After completion of the course students are able to use the key ergonomic design principles of computer-assisted programs and know the latest scientific development in the field.

555345S Advanced course in product development
Scope: 6 ECTS
Timing: Autumn
Objectives: The course is divided into two parts, the first of which is focused on the creative design process and comparing between different product development methods. The second part focuses on commercialization of an idea. The aim of the course is to persuade students with basic technological knowledge, towards innovativeness, to critical thinking, and to understanding the significance and challenges of customer driven product development.
Learning outcomes: After finishing the course, the student will able to analyze product development processes and the work of a designer in context-linked development processes. The student will also be able to create methods for an efficient development process and its management.
Contents: During the course create and systematic working methods as basis for product development are compared. The course covers the concepts of competence management, compares different product development methods and creates a link between research and development work in commercialization of innovations. The practical work of the course goes deeper into the planning phase of a product development process, its organization and controlling.

Other information:
Language of instruction: English

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Other information:
Language of instruction: English
Responsible person: Harri Haapasalo
Other information: 
Language of instruction: English

555346S Advanced course in technology management
Scope: 5 ECTS
Timing: Autumn
Objectives: The aim of the course is to familiarize students with a current issue in technology management.
Learning outcomes: After finishing the course, the student will be able to use the methods and models studied during the course.
Contents: During the course a specific topic in technology management is studied in detail. The topic is chosen from the current issues in technology management at that point in time.
Working methods:
Target group: 
Prerequisites: 
Study materials: 
Assessment methods: 
Grading: 
Responsible person: Harri Haapasalo
Other information: 
Language of instruction: English

555347S Seminar in technology management
Scope: 5 ECTS
Timing: Autumn
Objectives: The aim of the course is to go deeper into the specific questions of technology management and doing related research. A student may specify his/her studies in a certain area by completing a seminar or a research project.
Learning outcomes: After finishing the course, the student will be able to present research areas related to technology management. The student will also be able to assess related research and to critically discuss it.
Contents: Each seminar piece discusses a certain topic in technological management in great detail. The topic area is specified according to students’ wishes. On top of lectures the course includes completion of a personal research report.
Working methods:
Target group: 
Prerequisites: 
Study materials: 
Assessment methods: 
Grading: 
Responsible person: Harri Haapasalo
Other information: 
Language of instruction: English

555348S Research project in technology management
Scope: 5 ECTS
Timing: Autumn / Spring
Objectives: The student is offered an opportunity to combine and apply knowledge from earlier courses in technology management in form of a broad research project. The student familiarizes himself/herself with doing research and reporting their findings.

Learning outcomes: After finishing the course, the student will able to analyze and develop company activities using technology management methods.

Contents: Completion of the course is agreed on one-to-one with the instructor. An accepted completion of the work requires planning of a research plan, familiarization with related literature, presented a solution to the researched question, and a written report. It is also possible to complete the course as a broader work piece of more than 5 ECTS credits if agreed so with the instructor.

Working methods:

Target group:

Prerequisites:

Study materials:

Assessment methods:

Grading:

Responsible person: Harri Haapasalo

Other information:

Language of instruction: English