Opasraportti

Field of Industrial Engineering and Management (2015 - 2016)

Tutkintorakenteet

Msc (Tech) in Industrial Engineering and Management

Tutkintorakenteen tila: archived

Lukuvuosi: 2015-16

Lukuvuoden alkamispäivämäärä: 01.08.2015

Supplementary studies or "Bridge Studies" (enintään 60 op)

These studies are meant only for students who got admission directly to the IEM Master programme and haven't had IEM studies in earlier studies.

From the course list will be chosen the courses which has been discussed with the study advisor. One of the courses (A-level, 5 ECTS cr) can be included in the master's degree.

A440257: Supplementary studies, Industrial Engineering and Management, 0 - 60 op

COMMON STUDIES IN MAJORS (vähintään 20 op)

555301S Reserach Seminar in IEM is related for preparing Master's Thesis. It is recommended to take this course during the 2nd autumn semester of Master Studies.

555304S Advanced Internship it recommended to take at least during the summer season between 1st and 2nd year of Master Studies and reporting on the 2nd autumn semester of Master Studies.

A440227: Major Studies / Common Studies, Advanced Module, 20 op
- *Common studies*
  - 555313S: Management, 5 op
  - 555314S: Management Information Systems, 5 op
  - 555301S: Research Seminar in IEM, 5 op
  - 555304S: Advanced Internship, 5 op

ADVANCED STUDIES IN MAJOR (vähintään 20 op)

Select one of the majors.

Advanced studies in Product Management

A440228: Major Studies / Product Management, Advanced Module, 20 op
Obligatory studies in Product Management
555350S: Technology Management, 5 op
555343S: Product Data management, 5 op
555346S: Product portfolio management, 5 op
555351S: Advanced Course in Product Development, 5 op

Advanced studies in Production Management

A440229: Major Studies/ Production Management, Advanced Module, 20 op
Obligatory studies in Production Management
555330S: Sourcing Management, 5 op
555331S: Advanced Supply Chain Management, 5 op
555332S: Operations Research, 5 op
555333S: Production Management, 5 op

SUPPLEMENTARY STUDIES OF MAJOR (vähintään 20 op)

- Select at least one of three supplementary modules and select elective advanced studies that the total of the module is at least 20 ECTS credits.

1. Organisation and knowledge management

A440259: Complementary Study Module of the Major/ Organization and Knowledge management, Advanced Module, 10 op
Obligatory studies of Organisation and knowledge management
555370S: Strategic Management, 5 op
555371S: Human Resource Management, 5 op

2. Project Management

A440260: Complementary Study Module of the Major/ Project Management, Advanced Module, 10 op
Obligatory studies of Project Management
555391S: Advanced Course in Project Management, 5 op
555382S: Management of a project-based firm, 5 op

3. Process and Quality Management

A440261: Complementary Study Module of the Major/ Process and Quality Management, Advanced Module, 15 op
Obligatory studies of Process and Quality Management
555390S: Statistical Process Management, 5 op
555389S: Systematic Process Improvement, 10 op

Advanced elective studies

A440262: Complementary Study Module of the Major/ Elective studies, Advanced Module, 5 - 10 op
Advanced elective studies
555376S: Organisational development, 5 op
555375S: Lab to Market, 5 op
555377S: Risk Management, 5 op
555378S: Seminar in industrial engineering and management, 5 op
555379S: Research Project in Industrial Engineering and Management, 5 op

ENGINEERING STUDIES (vähintään 20 op)

Choose the module according to your Bachelor studies or earlier studies. Courses (A, S) you can find in the study guides of field in weboodi.

Medical and Wellness Technology

A440265: Complementary Module, Biomedical Engineering, 20 - 30 op

Mining Technology and Mineral Processing

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op

Mechanical Engineering

A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Software Engineering

A440266: Complementary Module, Software Engineering, 20 - 30 op

Process Engineering

A440249: Supplementary Module, Process Engineering, 20 - 30 op

Civil Engineering

A440263: Complementary Module, Civil Engineering, 20 - 30 op

Electrical Engineering

A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Information Engineering

A440267: Complementary Module, Information Engineering, 20 - 30 op

Environmental Engineering

A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

ELECTIVE STUDIES (enintään 10 op)

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 programmes in Industrial Engineering and Management.

A440273: Special Module, 10 op

MASTER'S THESIS AND RELATED STUDIES (30 op)

MASTER'S THESIS

555300S: Master's Thesis, 30 op

Maturity Test

555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

BSc (Tech) in Industrial Engineering and Management

Tutkintorakenteen tila: published

Lukuvuosi: 2015-16

Lukuvuoden alkamispäivämäärä: 01.08.2015

BASIC AND INTERMEDIATE STUDIES (vähintään 120 op)

- Choose the language in which you have a long high school course curriculum.
- Choose 2nd domestic language

A440120: Basic and Intermediate Studies, Industrial Engineering and Management, 119,5 - 120 op

STUDY AND COMMUNICATION SKILLS

555203P: Study Skills, 2 op
900061A: Scientific Communication for Production Engineering and Management, 2 op
900062P: Communicative Oral Skills for Production Engineering and Management, 2 op
030005P: Information Skills, 1 op

FOREIGN LANGUAGE(choose one)

902011P: Technical English 3, 6 op
903012P: Technical German 3, 6 op

CHOOSE ONE

901008P: Second Official Language (Swedish), 2 op
900009P: Second Official Language (Finnish), 2 op

MATHEMATICS

031010P: Calculus I, 5 op
031078P: Matrix Algebra, 5 op
031075P: Calculus II, 5 op
031076P: Differential Equations, 5 op
031021P: Probability and Mathematical Statistics, 5 op

PHYSICS

761111P: Basic mechanics, 5 op

Compulsory

761111P-01: Basic mechanics, lectures and exam, 0 op
761111P-02: Basic mechanics, lab. exercises, 0 op

761113P: Electricity and magnetism, 5 op

Compulsory

761113P-01: Electricity and magnetism, lectures and exam, 0 op
761113P-02: Electricity and magnetism, lab. exercises, 0 op

761114P: Wave motion and optics, 5 op

Compulsory

761114P-01: Wave motion and optics, lectures and exam, 0 op
761114P-02: Wave motion and optics, lab. exercises, 0 op

COMPUTER SCIENCE

521141P: Elementary Programming, 5 op

ECONOMICS

724110P: Introductory Economics, 5 op
724105P: Management Accounting, 5 op
555213A: Sales and marketing, 5 op

IEM STUDIES

555225P: Basics of industrial engineering and management, 5 op
555285A: Project management, 5 op
555265P: Occupational Safety and Health Management, 5 op
555226A: Operations and Production, 5 op
555264P: Managing well-being and quality of working life, 5 op
555286A: Process and quality management, 5 op
555204A: Internship, 5 op
555242A: Product development, 5 op
555287A: Problem Solving in Business Cases, 5 op

ENGINEERING STUDIES (vähintään 40 op)

The modules include the technical engineering studies of the Bachelor’s degree programme. A student must choose one module of Engineering.

Medical and Wellness Technology

A440146: Module Preparing for the Major, Medical and Wellness Technology, 40 op
Compulsory
H440129: Module Preparing for the Major, Medical and Wellness Technology, 40 op
Compulsory
521109A: Electrical Measurement Principles, 5 op
580102P: Introduction to Medical and Wellbeing Technology, 5 op
764163P: Basic biophysics, 5 op
ay402961P: Basics of Anatomy and Physiology (OPEN UNI), 5 op
041201A: Basics in eHealth, 5 op
080901A: Introduction to Technology in Clinical Medicine, 5 op
521302A: Circuit Theory 1, 5 op
761116P: Radiation physics, biology and safety, 3 op

Mining Technology and Mineral Processing

A440145: Module Preparing for the Major, Mining Technology and Mineral Processing, 40 op
Compulsory
H440128: Module Preparing for the Major, Mining Technology and Mineral Processing, 40 op
Compulsory
477011P: Introduction to Process and Environmental Engineering I, 5 op
477201A: Material and Energy Balances, 5 op
477401A: Thermodynamic Equilibria, 5 op
488010P: Introduction to Process and Environmental Engineering II, 5 op
477051A: Automation Engineering, 5 op
477322A: Heat and Mass Transfer, 5 op
477304A: Separation Processes, 5 op
477052A: Fluid Mechanics, 5 op

Mechanical Engineering

A440141: Module Preparing for the Major, Mechanical Engineering, 40 op
Alternative
H440124: Module Preparing for the Major, Machinery Design, 40 op
Compulsory
464101A: Machine drawing and CAD, 5 op
461102A: Statics, 5 op
465101A: Introduction to materials for mechanical engineering, 5 op
461103A: Strength of materials I, 5 op
464102A: Design of machine elements, 10 op
463101A: Introduction to manufacturing technology, 5 op
461106A: Dynamics, 5 op
H440133: Module Preparing for the Major, Materials Engineering, 40 op
Compulsory
462103A: Introduction to Maintenance, 5 op
465103A: Principles of metal shaping and forming, 5 op
465101A: Introduction to materials for mechanical engineering, 5 op
463101A: Introduction to manufacturing technology, 5 op
465102A: Materials for mechanical engineering, 5 op
465104A: Heat treatment and welding of metals, 5 op
463103A: Quality in production and dimensional measurements, 5 op
463102A: Manufacturing technology I, 5 op
H440134: Module Preparing for the Major, Manufacturing Technology, 40 op
Compulsory
464101A: Machine drawing and CAD, 5 op
462103A: Introduction to Maintenance, 5 op
465101A: Introduction to materials for mechanical engineering, 5 op
463101A: Introduction to manufacturing technology, 5 op
463104A: Advanced manufacturing methods, 7 op
463103A: Quality in production and dimensional measurements, 5 op
462102A: Machine automation actuators, 5 op
463102A: Manufacturing technology I, 5 op

Software Engineering

A440147: Module Preparing for the Major, Software Engineering, 40 op
- *Compulsory*
  - H440130: Module Preparing for the Major, Software Engineering, 40 op
    - *Compulsory*
      - 521145A: Human-Computer Interaction, 5 op
      - 811312A: Data Structures and Algorithms, 5 op
      - 521150A: Introduction to Internet, 5 op
      - 811167P: Introduction to Information Systems Design, 5 op
        - *Compulsory*
          - 811167P-01: Introduction to Information Systems Design, exercise work, 0 op
          - 811167P-02: Introduction to Information Systems Design, exam, 0 op
      - 521286A: Computer Systems, 8 op
      - 521457A: Software Engineering, 5 op
      - 811379A: Basics of Human Computer Interaction, 5 op
      - 811395A: Basics of Databases, 5 op

Process Engineering

A440143: Module Preparing for the Major, Process Engineering, 40 op
- *Compulsory*
  - H440126: Module Preparing for the Major, Process Engineering, 40 op
    - *Compulsory*
      - 477011P: Introduction to Process and Environmental Engineering I, 5 op
      - 477201A: Material and Energy Balances, 5 op
      - 477401A: Thermodynamic Equilibria, 5 op
      - 488010P: Introduction to Process and Environmental Engineering II, 5 op
      - 477051A: Automation Engineering, 5 op
      - 477322A: Heat and Mass Transfer, 5 op
      - 477304A: Separation Processes, 5 op
      - 477052A: Fluid Mechanics, 5 op

Civil Engineering

A440142: Module Preparing for the Major, Civil Engineering, 40 op
- *Compulsory*
  - H440125: Module Preparing for the Major, Civil Engineering, 40 op
    - *Compulsory*
      - 464101A: Machine drawing and CAD, 5 op
      - 461102A: Statics, 5 op
      - 461103A: Strength of materials I, 5 op
      - 466101A: Introduction to building construction, 5 op
      - 466102A: Introduction to structural design, 3 - 5 op
      - 466113S: Construction economics, 5 op
      - 466111S: Building physics, 5 op
      - 466104S: Foundation engineering, 5 op

Electrical Engineering

A440149: Module Preparing for the Major, Electrical Engineering, 40 op
- *Compulsory*
  - H440132: Module Preparing for the Major, Electrical Engineering, 40 op
    - *Compulsory*
      - 521109A: Electrical Measurement Principles, 5 op
      - 521077P: Introduction to Electronics, 5 op
      - 521301A: Digital Techniques 1, 8 op
      - 521302A: Circuit Theory 1, 5 op
      - 521329A: Hands-on Course in Wireless Communication, 5 op
      - 521303A: Circuit Theory 2, 5 op
      - 521104P: Introduction to Material Physics, 5 op
      - 521431A: Principles of Electronics Design, 5 op

Information Engineering

A440148: Module Preparing for the Major, Information Engineering, 40 op
Compulsory
H440131: Module Preparing for the Major, Information Engineering, 40 op
Compulsory
521109A: Electrical Measurement Principles, 5 op
521145A: Human-Computer Interaction, 5 op
521150A: Introduction to Internet, 5 op
521301A: Digital Techniques 1, 8 op
521286A: Computer Systems, 8 op
521329A: Hands-on Course in Wireless Communication, 5 op
521457A: Software Engineering, 5 op

Environmental Engineering

A440144: Module Preparing for the Major, Environmental Engineering, 40 op
Compulsory
H440127: Module Preparing for the Major, Environmental Engineering, 40 op
Compulsory
477011P: Introduction to Process and Environmental Engineering I, 5 op
477201A: Material and Energy Balances, 5 op
477401A: Thermodynamic Equilibria, 5 op
488010P: Introduction to Process and Environmental Engineering II, 5 op
477051A: Automation Engineering, 5 op
477322A: Heat and Mass Transfer, 5 op
477304A: Separation Processes, 5 op
477052A: Fluid Mechanics, 5 op

Other Engineering Studies

A400072: Module Preparing for the Option, 20 - 40 op

OPTIONAL STUDIES (enintään 10 op)

Optional Studies.

Choose the courses to get total of 180 ECTS to your degree.

A440171: Optional Studies, Bachelor of Science (Industrial Engineering and Management), 0 - 20 op

BACHELOR'S THESIS AND RELATED STUDIES (vähintään 10 op)

555200A: Bachelor's Thesis / Industrial Engineering and Management, 8 op
555201A: Bachelor's Thesis Seminar, 2 op
555202A: Maturity Test / Bachelor of Science in Industrial Engineering and Management, 0 op

MSc (Tech) in Product Management

Tutkintorakenteen tila: published

Lukuvuosi: 2015-16

Lukuvuoden alkamispäivämäärä: 01.08.2015

ORIENTATION STUDIES (vähintään 40 op)

All the studies in this module are compulsory.

A440140: Orientation studies, Product Management, 28 op
Compulsory
555242A: Product development, 5 op
555313S: Management, 5 op
555350S: Technology Management, 5 op
555351S: Advanced Course in Product Development, 5 op
555371S: Human Resource Management, 5 op
555301S: Research Seminar in IEM, 5 op
555391S: Advanced Course in Project Management, 5 op

MAJOR SUBJECT STUDIES (vähintään 50 op)

All studies in this module are compulsory.

A440258: Major subject studies, Product Management, 62 op
Compulsory
555314S: Management Information Systems, 5 op
555343S: Product Data management, 5 op
555346S: Product portfolio management, 5 op
555382S: Management of a project-based firm, 5 op
555376S: Organisational development, 5 op
555333S: Production Management, 5 op
555375S: Lab to Market, 5 op
555304S: Advanced Internship, 5 op
555378S: Seminar in industrial engineering and management, 5 op
555379S: Research Project in Industrial Engineering and Management, 5 op

THESIS (vähintään 30 op)

555300S: Master's Thesis, 30 op
555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

MSc (Tech) Degree /Industrial Engineering and Management Degree Programme (3+2 year)

Tutkintorakenteen tila: archived

Lukuvuosi: 2015-16

Lukuvuoden alkamispäivämäärä: 01.08.2015

COMMON Studies in Majors, 20 ECTS cr (vähintään 20 op)

- **Course Structure and learning outcomes**
- **555301S Research Seminar in IEM** is related for preparing Master's Thesis. It is recommended to take this course during the 2nd autumn semester of Master Studies.
- **555304S Advanced Internship** it recommended to take at least during the summer season between 1st and 2nd year of Master Studies and reporting on the 2nd autumn semester of Master Studies.
- Courses taken in other higher education institutes can be included in this module by using the course code **555307M**.

A440227: Major Studies / Common Studies, Advanced Module, 20 op

Common studies
555313S: Management, 5 op
555314S: Management Information Systems, 5 op
555301S: Research Seminar in IEM, 5 op
555304S: Advanced Internship, 5 op

ADVANCED Studies in Major, 20 ECTS cr (vähintään 20 op)

- Select the Major **Product Management** or **Production Management.**
- Courses taken in other higher education institutes can be included in this module by using the course code **555308M**.

Advanced studies in Product Management

A440228: Major Studies / Product Management, Advanced Module, 20 op
Obligatory studies in Product Management
555350S: Technology Management, 5 op
555343S: Product Data management, 5 op
555346S: Product portfolio management, 5 op
555351S: Advanced Course in Product Development, 5 op

Advanced studies in Production Management

A440229: Major Studies/ Production Management, Advanced Module, 20 op
Obligatory studies in Production Management
555330S: Sourcing Management, 5 op
555331S: Advanced Supply Chain Management, 5 op
555332S: Operations Research, 5 op
555333S: Production Management, 5 op

SUPPLEMENTARY Studies of Major, 20 ECTS cr (vähintään 20 op)

- Select at least one of three supplementary modules.
- Courses taken in other higher education institutes can be included in this module by using the course code 555309M.

1. Organisation and knowledge management

A440259: Complementary Study Module of the Major/ Organization and Knowledge management, Advanced Module, 10 op
Obligatory studies of Organisation and knowledge management
555370S: Strategic Management, 5 op
555371S: Human Resource Management, 5 op

2. Project Management

A440260: Complementary Study Module of the Major/ Project Management, Advanced Module, 10 op
Obligatory studies of Project Management
555391S: Advanced Course in Project Management, 5 op
555382S: Management of a project-based firm, 5 op

3. Process and Quality Management

A440261: Complementary Study Module of the Major/ Process and Quality Management, Advanced Module, 15 op
Obligatory studies of Process and Quality Management
555390S: Statistical Process Management, 5 op
555389S: Systematic Process Improvement, 10 op

Advanced elective studies

A440262: Complementary Study Module of the Major/ Elective studies, Advanced Module, 5 - 10 op
Advanced elective studies
555376S: Organisational development, 5 op
555375S: Lab to Market, 5 op
555377S: Risk Management, 5 op
555378S: Seminar in industrial engineering and management, 5 op
555379S: Research Project in Industrial Engineering and Management, 5 op

ENGINEERING Studies, 20 ECTS cr (vähintään 20 op)

- Choose the module according to your Bachelor studies or earlier studies. Courses (A, S) you can find in the study guides of field in Weboodi.
- Courses taken in other higher education institutes can be included in this module by using the course code **555305M**.

Medical and Wellness Technology

A440265: Complementary Module, Biomedical Engineering, 20 - 30 op

Mining Technology and Mineral Processing

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op

Mechanical Engineering

A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Software Engineering

A440266: Complementary Module, Software Engineering, 20 - 30 op

Process Engineering

A440249: Supplementary Module, Process Engineering, 20 - 30 op

Civil Engineering

A440263: Complementary Module, Civil Engineering, 20 - 30 op

Electrical Engineering

A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Information Engineering

A440267: Complementary Module, Information Engineering, 20 - 30 op

Environmental Engineering

A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

Other engineering module

ELECTIVE Studies, 0 - 10 ECTS cr (enintään 10 op)

- 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 programmes in Industrial Engineering and Management.
- Courses taken in other higher education institutes can be included in this module by using the course code **555306M**.

A440269: Special Module, 0 - 10 op

MASTER'S THESIS and related Studies, 30 ECTS cr (30 op)

555300S: Master's Thesis, 30 op
555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

764163P-01: Basic biophysics (part 1): Introduction to biophysics, 0 op
764163P-02: Basic biophysics (part 2), 0 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

A440257: Supplementary studies, Industrial Engineering and Management, 0 - 60 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440227: Major Studies / Common Studies, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Common studies

555313S: Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 1.

Learning outcomes:

Upon completion of the course the student understands the key concepts of general management. After completing the course the student knows the historical developments in the management thought. The student has an understanding about the qualifications of a manager in a modern organization. The student understands the principles of the managerial decision making. The student can distinguish between the terms management and leadership. The student has an understanding about good managerial practices.

Contents:

Managers and Managing, The Evolution of Management Thought, Values, Attitudes, Emotions, and Culture: The Manager as a Person, Ethics and Social Responsibility, Managing Diverse Employees in a Multicultural Environment, Decision Making, The Manager as a Planner and Strategist, Managing Organizational Structure and Culture, Organizational Control and Change, Motivation and Performance, Leadership, Effective Groups and Teams, Promoting Effective Communication, Managing Conflict, Politics, and Negotiation.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, case examples 10 h, self-study 115 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Jones G. R. & George J.M (2014) Contemporary Management. McGraw-Hill. Case descriptions.

Assessment methods and criteria:

The assessment is based on the exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

555314S: Management Information Systems, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Periods 3-4.

Learning outcomes:

Upon completion of the course, the student can explain the key concepts of management information systems. The student is familiar with the significance of information and information management in modern business process management. The student can define the information needs of management processes and understands how information systems can meet these needs. After completing the course, the student is aware of the current trends in management information systems technologies and practices. After the course, the student has readiness to participate for enterprise information system designing, purchasing, and development tasks as a role of industrial engineer/process developer. During the course, the students will also develop their skills in reflective, self-directing learning.

Contents:

Key concepts of management information systems (MIS), information systems in decision making and leadership, the effects of information technology in business processes, current trends in management information systems technologies and practices, multidisciplinary nature of information systems and their development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 14 h / learning diary 27 hours / self-study and group work 93 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent, 555313S Management.
Additional information about the course and **pre-assignments** can be found in Noppa (noppa.oulu.fi).

Recommended optional programme components:

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Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment that includes a reflective learning diary (returned on a weekly basis) and conducting the learning tasks.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Hanna Kropsu-Vehkaperä.

Working life cooperation:

No.

Other information:

Substitutes the course 555344S Management Information Systems.

555301S: Research Seminar in IEM, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-4.

Learning outcomes:

Upon completion the student knows scientific process and different research methods. The student can select an appropriate method for his/her master's thesis work. The student can evaluate validity of research work and provide constructive criticism. The student can report research findings in the form of academic research report and participate in academic discussion.

Contents:

Research approach, qualitative and quantitative research methods, structure of research report, evaluating validity of research, constructive criticism and participation in scientific discussion.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 18h, self-study 116h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

Research report is based on research work student is doing for his/her master's thesis work

Recommended or required reading:

Lecture material. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course includes lectures/seminars and active participation in discussion, presentation of own research work, providing constructive feedback on ongoing research work, evaluation of two completed M.Sc. thesis, and report written in article format of own master's thesis research work.

Grading:

The course utilizes verbal grading "Pass/Fail".

Person responsible:

Professor Jaakko Kujala.

Working life cooperation:

No.

Other information:

Seminars will include separate lectures about research approach, qualitative research methods and quantitative research methods. These lectures are recommended to be completed before starting own research work for master's thesis. Participation in these three lectures is mandatory to participate in the course and they are lectured two times a year.

555304S: Advanced Internship, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Practical training
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555311S Advanced Internship 3.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish/ English

Timing:

Internship is usually performed while working in summertime during the Master's studies. It is recomendated to report the internship experience on the 2nd autumn semester in Master's Studies. Course is organized twice in a year. Reporting is performed during periods 1 - 2 or 3 - 4.

Target group:

Industrial Engineering and Management Master's students

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Grading:

pass/ fail

Person responsible:

Study Advisor of Industrial and Engineering and Management Degree Programme

Working life cooperation:

Yes

Other information:

Substitutes the course 555311S Advanced Internship 3 or 6 ECTS cr.

A440228: Major Studies / Product Management, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies in Product Management

555350S: Technology Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

555340S Technology Management 4.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

After finishing the course, the student will be 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, acquirement, and movement are also covered.

Mode of delivery:

The tuition will be implemented as face-to-face teaching

Learning activities and teaching methods:

Lectures 21 h / exercises, group work and self-study 113 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product Development.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and selected articles, will be defined at the beginning of the course.

Assessment methods and criteria:

Exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555340S Technology Management.

555343S: Product Data management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen

Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarizes a student with the product processes of an enterprise and specifically the meaning of product data in different stages of product process. After finishing the course, a student knows what product data is and how it can be used for business purpose. A student is familiar with the basic concepts of product data management (PDM) and is aware of the basic tools used for PDM. After finishing the course, a student will be able to analyze existing and future products from product structure viewpoint. Students will be able to analyze the company's product data management as a whole and to give suggestions based their analysis.

Learning outcomes:

Product information management concepts, its history and challenges, PDM-processes: managing product models, managing documents and configurations as well as tracing information, PDM-system and its functions, PDM-project and implementation of the system.

Contents:

The tuition will be implemented as face-to-face teaching.

Mode of delivery:

Lectures 16 h / group work and self-study 118 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

555242 Product development.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and selected articles. Saaksvuori A & Immonen A. (2008) Product lifecycle management, 8 ed. pages 1-65 and 91-176.

Assessment methods and criteria:

Group work report and exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

-

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Required proficiency level:

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Periods 3-4.

Learning outcomes:

The course familiarizes students with the broad concepts of product management. After finishing the course, the student understands central principles and contents of product management. Student knows the basics of product portfolio management and understands the ways to analyse products business case. A student learns to see product management as an organizational lifecycle function that focus managing all products and related actions in all product lifecycle phases. The student can apply the learned things and methods in different industries in order to develop systematic product management.

Contents:

Basic issues in product management, sub-processes that are included in product management, methods and tools for product management, product portfolio management, product business case.

Mode of delivery:

The tuition will be implemented as face-to-face learning.

Learning activities and teaching methods:

Will be defined at the beginning of the course.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product development, 555350S Technology management.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

Will be defined at the beginning of the course.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

-

555351S: Advanced Course in Product Development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

555345S	Advanced Course in Product Development	6.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student understands the objectives of requirements engineering in order to develop sustainable products. The course familiarizes the student to requirements engineering process and its key activities. After finishing the course, the student will be able to analyze requirements engineering in product development processes. The student knows Design for Excellence (DfX) practice. The student can recognize different stakeholder specific requirements and their diversity.

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritization and valuation, Design for Excellence (DfX), different stakeholders and their requirements for product development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 20 h / group work and self-study 114 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:
555242A Product development, 555350S Technology management.

Recommended optional programme components:
-

Recommended or required reading:
Will be defined at the beginning of the course.

Assessment methods and criteria:
Group work, exam.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:
Professor Harri Haapasalo.

Working life cooperation:
No.

Other information:
Substitutes course 555345S Advanced Course in Product Development.

A440229: Major Studies/ Production Management, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies in Production Management

555330S: Sourcing Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish
Leikkaavuudet:

555323S	Sourcing Management	3.0 op

ECTS Credits:
5 ECTS credits.

Language of instruction:

Finnish. English material will also be used.

Timing:

Period 2

Learning outcomes:

The course familiarizes a student with the overall concept of sourcing management. After completing the course student knows the key concepts of sourcing and purchase management and can explain these. The student can describe the structures of sourcing and purchasing organizations and can explain the meaning of sourcing management in the performance of operations. The student can analyze the purchasing activities in a company and can produce improvement proposals based on the analysis. After the course the student can take part in the sourcing development in the role of an expert.

Contents:

Purchasing operations in a manufacturing company, the principles of the sourcing and purchasing strategy and practices, suppliers and products, IT systems for sourcing and purchase.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, assignment guidance 10 h, group work 115 hrs.

Target group:

Industrial Engineering Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes. Other material will be defined at the beginning of the course.

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555323S Sourcing Management.

555331S: Advanced Supply Chain Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555324S Advanced Supply Chain Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 3-4.

Learning outcomes:

Upon completion of the course the student should be able to define supply chain management concepts, describe supply chain structures, and explain the importance of effective supply chain management. He /she can analyze supply chain operations and propose development areas based on the analysis. After the course, the student can act in an expert role in supply chain development.

Contents:

Supply chain management concepts, supply chain structures, effectiveness of supply chain, supply chain analysis and development.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 8 h / exercises 4 h / group work 68 h / self-study 54 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Sakki, J. (2009) Tilaus-toimitusketjun hallinta. Jouni Sakki Oy. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The grade will be based on the group work (60 % of the grade) and book examination (40 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555324S Advanced Supply Chain Management.

555332S: Operations Research, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish
Leikkaavuudet:

555342S Operations Research 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Period 4.

Learning outcomes:

Upon completion of the course the student knows the basic concepts of operations research and its applications in operations and production activities and decision-making in companies. The student is capable of applying quantitative methods typical to the field of operations research in practical problem solving.

Contents:

What is operations research, linear and dynamic programming, network and transportation algorithms, decision analysis, inventory models, queueing systems, simulation modeling.

Mode of delivery:

The tuition will be implemented as face-to-face teaching (lectures, classroom exercises and group work).

Learning activities and teaching methods:

Lectures 20 h / classroom exercises 20 h / independent study and group work 94 h.

Target group:

Industrial engineering and management students.

Prerequisites and co-requisites:

Bachelor in industrial engineering and management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Taha, H. A. (2011) Operations Research: An Introduction, 9/E. Prentice Hall, 832 pp. and material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the required coursework consisting of the exercises handed out during the classroom study and a supporting analytic exercise.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess, Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555342S Operations Research.

555333S: Production Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: English
Leikkaavuudet:

555322S Production Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student understands the key concepts of operations and production management. The student should know the essential production strategies. The student should also understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analyzing and constructing development plans for production organizations. Upon completion of the course the student can apply the management methods also in service systems. The student also understands the principles of the sustainable development in production.

Contents:

Production strategies, sustainable development, Supply Chain Management, Just-In-Time (JIT), Theory of Constraints (TOC), Lean, Toyota Production System (TPS), management of the production of services.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 20 h, assignment guidance 20 h, group work 95 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Liker J (2004) The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. Goldratt, E. M. (2012) The Goal: A Process of Ongoing Improvement. Material delivered during the lectures.

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555322S Production Management.

A440259: Complementary Study Module of the Major/ Organization and Knowledge management, Advanced Module, 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Organisation and knowledge management

555370S: Strategic Management, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Majava

Opintokohteen kielet: English

Leikkaavuudet:

555320S Strategic Management 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

Upon completion of the course the student should be able to utilize strategic thinking, planning, and management. He/she can analyze and plan complex global business operations. After the course, the student can participate in strategic planning and strategy implementation in organizations. The student knows how to apply strategy analysis frameworks and analyze the implementation of the chosen strategy.

Contents:

Strategic thinking, strategic planning, strategic management, strategy analysis frameworks, strategy implementation with a simulation, analysis of the strategy implementation.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 6 h / exercises 6 h / group work 122 h. Alternatively independent learning method: book examination 134 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Isoherranen, V. (2012) Strategy analysis frameworks for strategy orientation and focus, University of Oulu, Faculty of Technology, Industrial Engineering and Management. Mintzberg, H. et al. (2009) Strategy safari: the complete guide through the wilds of strategic management, 2nd ed. Harlow, FT Prentice Hall.

Assessment methods and criteria:

This course utilizes continuous assessment. The group work includes the creation of strategic plan (10 % of the grade), business simulation (30 % of the grade), and the analysis of the strategy (60 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555320S Strategic Management.

555371S: Human Resource Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English
Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

Required proficiency level:

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 4.

Learning outcomes:

Upon completion of the course the student understands the key concepts of human resource management. He should be able to utilize methods in analyzing and planning of human resource practices in organizations. After the course, the student can participate in human resource practices planning and implementation in organizations. The student knows how to apply PCMM (People Capability Maturity Model) frameworks. The student knows the basic Finnish laws, bylaws and trade agreements in the area of human resource management.

Contents:

Organizational capability maturity. People management practices in the areas of: Staffing, Communication and Coordination, Work Environment, Performance Management, Training and Development, Compensation, Competency Analysis, Workforce Planning, Competency Development, Career Development, Competency-Based Practices, Workgroup Development and Participatory Culture. Competency Integration, Empowered Workgroups, Mentoring. Finnish laws, bylaws and trade union agreements in the area of human resource management.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, assignment guidance 10 h, group work115 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Curtis, B., Hefley, W.E., & Miller, S. (2002). People Capability Maturity Model: Guidelines for Improving the Workforce. Reading, MA: Addison-Wesley. or Curtis, B., Hefley, W.E., & Miller, S. (2009) People Capability Maturity Model (P-CMM) Version 2.0, Second Edition. http://www.sei.cmu.edu/reports/09tr003.pdf

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

A440260: Complementary Study Module of the Major/ Project Management, Advanced Module, 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Project Management

555391S: Advanced Course in Project Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: English
Leikkaavuudet:

555381S Project Leadership 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

After the course, the student has an in-depth understanding of the most important project management areas, competences to identify and evaluate the most applicable managerial approaches for different types of projects and capabilities to develop project management processes in an organization.

Contents:

different type of projects and industry specific approaches to project management, managing large international projects, managing projects' external environment, project governance, project risk management, project time and schedule management

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures, web-based-lectures and workshops 36h, group exercises 36h, self-study 62h

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture and exercise material.

Assessment methods and criteria:

This course utilizes continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture (30% of the grade), group exercise presented and discussed in the workshops (30% of the grade), and exam (40% of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Assistant professor Kirsi Aaltonen

Working life cooperation:

-

Other information:

Substitutes course 555381S Project Leadership.

555382S: Management of a project-based firm, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jaakko Kujala
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 4.

Learning outcomes:

The course provides the student with the basic skills to manage a company practicing project business. Upon completion the student can explain the management areas of project business and their essential contents. The student can compare the specific features of project business in different business environments and analyse their effect on the business model of the company. The student can evaluate the significance of a single project and its management in reaching business goals.

Contents:

The specific features of project business, business models of a project company, project sales and marketing, contracting, negotiation analytic approach, project portfolio management, management of project networks.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 24h, self-study56h, group exercise 54h

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course utilizes continuous assessment. During the course, the students must write a learning diary for each lecture and participate actively in the lectures. 40% of the grade is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jaakko Kujala

Working life cooperation:

No.

Other information:

-

A440261: Complementary Study Module of the Major/ Process and Quality Management, Advanced Module, 15 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Process and Quality Management

555390S: Statistical Process Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Osmo Kauppila
Opintokohteen kielet: Finnish
Leikkaavuudet:

555380S Quality Management 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish.

Timing:

Period 1.

Learning outcomes:

Upon completion the student can analyze and improve the processes of an organization with the help of statistical tools. The student is able to disseminate the applicability of various statistical tools and methods in different kinds of organizational environments.

Contents:

Processes in an organization from a statistical viewpoint, tools and methods of statistical process control, process improvement using numeric data, stages, challenges and implementation of data analysis, the role of statistical methods in various management philosophies.

Mode of delivery:

The tuition will be implemented as face-to-face teaching (integrated classroom lectures and exercises).

Learning activities and teaching methods:

28 h lectures, 105 h independent study on course exercises.

Target group:

Industrial Engineering and Management students and other students studying taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

555286A Process and Quality Management

Recommended optional programme components:

-

Recommended or required reading:

The study materials will be announced at the beginning of the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises and an accompanying course assignment. The course grade is calculated based on the grades of these two course components.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555380S Quality Management.

555389S: Systematic Process Improvement, 10 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Osmo Kauppila
Opintokohteen kielet: Finnish

ECTS Credits:

10 ECTS credits.

Language of instruction:

Finnish

Timing:

Periods 1 - 2

Learning outcomes:

Upon completion the student can manage the improvement and problem solving in a process using quality management tools. The student can explain the steps of the DMAIC problem solving model and apply the

correct tools for each step. The student is able to apply quality tools into real life process data with the help of MINITAB software and to analyse the results. The student increases his/her understanding of the process type studied in the course exercise.

Contents:

Problem solving using DMAIC, the Six Sigma body of knowledge quality tools, use of MINITAB software, process improvement in practice.

Mode of delivery:

The tuition will be implemented as blended teaching.

Learning activities and teaching methods:

Lectures and related exercises, site visit, a large group exercise related to a process operating in practice.

Target group:

Industrial Engineering and Management students, other students taking Industrial Engineering and Management as minor, postgraduate students.

Prerequisites and co-requisites:

Bachelor in Industrial Engineering and Management or equivalent. Basic knowledge of statistical process control.

Recommended optional programme components:

-

Recommended or required reading:

Kubiak, TM & Benbow DW (2009) The Certified Six Sigma Black Belt Handbook, Second Edition. ASQ Quality Press, Milwaukee. 620 s. and material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the group work as an active team member, take part in the course lectures and return the related exercises.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Osmo Kauppila.

Working life cooperation:

-

Other information:

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A440262: Complementary Study Module of the Major/ Elective studies, Advanced Module, 5 - 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Module

Laji: Study module

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Advanced elective studies

555376S: Organisational development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used (the course can be completed in English as a book examination).

Timing:

Period 1.

Learning outcomes:

After completing the course student is able to explain the general models regarding organisational development and is able to adapt the most central ones to the work organisations. Student can also choose the most suitable models for different situations and can interpret the results gained from different approaches. The student is able to explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation. He is able to identify development needs and opportunities in companies and other organisations. The student also knows the basics of applying new research results in practical settings.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, security, and responsibility. Different types of indicators and applications will be discussed, such as occurrence, frequency indicators, economic indicators, and scales. Various concepts will be discussed, for example, in relation with change processes (e.g. strategy, owner, partnerships, sizes of operations and personnel), implementation, participation, intervention, action research, and learning organization.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and web-based teaching).

Learning activities and teaching methods:

Lectures 22 h / self-study 100 h / group work & exercises 12 h.

Target group:

Industrial Engineering and Management and Master’s Program in Product Management students.

Prerequisites and co-requisites:

555265P Occupational safety and health management, 555264P Managing well-being and quality of working life, 555371S Human resource management.

Recommended optional programme components:

Human resource management, 555370S Strategic management, 555377S Risk Management. Research project in industrial engineering and management related to Organisation and knowledge management topic and Faculty of Education’s Organisational psychology course can be conducted to complement this course.

Recommended or required reading:

Applicable parts of: Hatch, M. J. and Cunliffe A.N. (2013) Organization Theory, Modern, Symbolic, and Postmodern Perspectives. Third Edition, Oxford University Press. Väyrynen, S., Häkkinen, K., Niskanen, T. (Eds.) (2015). Integrated Occupational Safety and Health Management - Solutions and Industrial Cases. Springer, Production & Process Engineering. 248 p. Other literature will be informed at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (50 % weight).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Seppo Väyrynen

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

555375S: Lab to Market, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Majava

Opintokohteen kielet: English

Leikkaavuudet:

555327S	Seminar in Production Management : Lab to Market	5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student should be able to analyze an industry to identify viable business ideas and opportunities. He/she can use different frameworks including scenario planning, customer driven analysis, user needs analysis, and technology evolution analysis. The student can apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilize frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective. The student can also present and defend own ideas, and critically examine and discuss the recommendations of others.

Contents:

Industry analysis, scenario planning, customer driven analysis, user needs analysis, technology evolution analysis, opportunity identification, business models.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 28 h / self-study and group work 106 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are mandatory individual assignments (75 % of the grade) and a group work (25 % of the grade).

Grading:

1-5.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555327S Lab to Market.

555377S: Risk Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: English
Leikkaavuudet:

555321S	Risk Management	3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 2.

Learning outcomes:

The objective of the course is to provide a student an overall perspective to risk management in organizations. Upon completion the student can explain the key concepts of risk and uncertainty management, classify risks, conduct systematic risk analyses, apply risk management methods and tools and make informed improvement suggestions related to risk management in organizations. The student understands the role of risk management in organizations and can compare

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification, systematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organizing of risk management, risk management in different contexts, risk governance.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 26h, self-study 54h, group assignment 54h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students..

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture. The materials will be defined at the beginning of the course.

Assessment methods and criteria:

Group assignment, in-class case assignments, exam. Course grading is based on exam and group assignment.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

No.

Other information:

Substitutes course 555321S Risk Management.

555378S: Seminar in industrial engineering and management, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555385S	Advanced Course in Quality Management	5.0 op
555386S	Advanced Course in Project Management	5.0 op
555347S	Seminar in Technology Management	5.0 op

ECTS Credits:
5 ECTS credits.

Language of instruction:
Finnish/English.

Timing:
Periods 1-4.

Learning outcomes:
Learning outcomes depend on the content of each seminar. The seminar topics are related to production management, product management, organization and knowledge management, project management, and process and quality management.

Contents:
Will be defined at the beginning of the course.

Mode of delivery:
Will be defined at the beginning of the course.

Learning activities and teaching methods:
Will be defined at the beginning of the course.

Target group:
Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:
-

Recommended or required reading:
Will be defined at the beginning of the course.

Assessment methods and criteria:
Will be defined at the beginning of the course.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
-

Working life cooperation:

-

Other information:

Substitutes courses 555347S Seminar in Product Management, 555385S
Research Project in Quality Management and 555386S Research Project in Project Management.

555379S: Research Project in Industrial Engineering and Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555367S	Exercises in Work Science	6.0 op
555387S	Project Work in Quality Management	5.0 op
555388S	Project Work in Project Management	5.0 op
555326S	Research Project in Production Management	5.0 op
555348S	Research project in product development management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English.

Timing:

Periods 1-4.

Learning outcomes:

Learning outcomes depend on the project work contents.

Contents:

Project work topics and types vary. The topics are typically related to actual problems in the industry.

Mode of delivery:

Will be defined at the beginning of the course.

Learning activities and teaching methods:

The methods are agreed with the project work instructor. The work can be done individually or in a group.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

The assessment is based on the project work report.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

-

Working life cooperation:

-

Other information:

The objective of the course is to apply the methods of industrial engineering and management in a company's development activities. The course provides the student with an opportunity to combine and apply his/her existing knowledge in a study project. The student familiarises himself/herself with research work and reporting of the results. Substitutes courses 555326S Research Project in Production Management, 555348S Research Project in Product Management, 555367S Exercises in Work Science 555387S Research Project in Quality Management and 555388S Research Project in Project Management.

A440265: Complementary Module, Biomedical Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440266: Complementary Module, Software Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440249: Supplementary Module, Process Engineering, 20 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440263: Complementary Module, Civil Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440267: Complementary Module, Information Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440273: Special Module, 10 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Special Module
Laji: Study module
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

555300S: Master's Thesis, 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

470099S	Master's Thesis in Industrial Engineering and Management	30.0 op

ECTS Credits:
30 ECTS credits.

Language of instruction:
Finnish / English.

Timing:
Periods 1-4.

Learning outcomes:

Upon completion of the course the student should be able to solve challenging problems in organizations independently. The student can create a research plan, and define a research problem and research questions. The student is able to manage his own work according to the research plan. The student can also utilize different information sources and critically evaluate the information obtained. The student can create a written report according to the instructions.

Contents:
The research topic is selected in co-operation with the instructor.

Mode of delivery:
The tuition will be implemented as self-study and face-to-face teaching.

Learning activities and teaching methods:
Self-study 804 h. The student defines the research topic in co-operation with the instructor. The thesis can be a theoretical

Target group:
Industrial Engineering and Management students and Master's Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:
The students will complete 555301S Research seminar in industrial engineering and management simultaneously.

Recommended or required reading:
-

Assessment methods and criteria:
This course includes writing a Master's Thesis.

Grading:
1-5.

Person responsible:
Industrial Engineering and Management professors and doctors.

Working life cooperation:
Yes.

Other information:
Substitutes course 477991S Master's Thesis.

555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Majava

Opintokohteen kielet: Finnish

Leikkaavuudet:

555312S Maturity Test / Industrial Engineering and Management 0.0 op

Ei opintojaksokuvauksia.

A440120: Basic and Intermediate Studies, Industrial Engineering and Management, 119,5 - 120 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Basic and Intermediate Studies

Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

STUDY AND COMMUNICATION SKILLS

555203P: Study Skills, 2 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555212P Orientation Course for New Students 1.0 op

900061A: Scientific Communication for Production Engineering and Management, 2 op

Voimassaolo: 01.08.2008 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Proficiency level:

-

Status:

Compulsory for the students undertaking the bachelor's degree in the Industrial Engineering and Management.

Required proficiency level:

-

ECTS Credits:

2 credits

Language of instruction:

Finnish

Timing:

The course begins in the first year of studies by introductory lessons and continues during the second or the third year of studies.

Learning outcomes:

The student should have mastered the basics of scientific communication. He/she should be able to view scientific writing as a process and prepare a scientific research report (among other scientific texts).

Contents:

Practises and distinctive features of scientific communication, writing as a process, critical and analytical reading strategies, style and language of science, essential questions of language planning.

Mode of delivery:

Multimodal teaching

Learning activities and teaching methods:

Introductory lessons 2 hrs, guiding in small gorups 3 hrs, distance teaching and independent study 49 hrs.

Target group:

Students undertaking the bachelor's degree in the Industrial Engineering and Management.

Prerequisites and co-requisites:

-

Recommended optional programme components:

The course is to be taken concurrently with the course 555210A Harjoittelu offered by the Department of Industrial Engineering and Management.

Recommended or required reading:

Material in Optima

Assessment methods and criteria:

Active participation in contact and distance teaching, independent study and completion of given assignments.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / fail

Person responsible:

Outi Mikkola

Working life cooperation:

Along with the course 555210A that includes practical training.

Other information:

-

900062P: Communicative Oral Skills for Production Engineering and Management, 2 op

Voimassaolo: 01.08.2008 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Proficiency level:

-

Status:

This course is obligatory for the Students of Industrial Engineering and Management and it is integrated to the Case course 555284A.

Required proficiency level:

-

ECTS Credits:

2 ECTS

Language of instruction:

Finnish

Timing:

the Autumn term of the 3rd year of studies

Learning outcomes:

Upon completion of the course the student should be familiar with the central principles of work and study-related communication, both oral and written, and be able to apply this knowledge in his/her own

communication. The student should be able to analyse and assess his/her own writing and the writing of his /her peers. He/she should be able to act in group communication situations in a target-oriented manner. The student should also be able to give and receive constructive criticism. The student knows how to act efficiently in situations of group communication.

Contents:

Presentations, preparing a presentation, presenting techniques, argumentation, non-verbal communication, negotiating skills and conventions, observation and analysis of speech communication situations.

Mode of delivery:

multi-modal teaching

Learning activities and teaching methods:

Contact teaching and independent work

Target group:

Students of Industrial Engineering and Management

Prerequisites and co-requisites:

-

Recommended optional programme components:

This course is integrated to the Case course 555284A.

Recommended or required reading:

the material in the Optima learning environment

Assessment methods and criteria:

Active participation in contact teaching, independent study and completion of given assignments. Read more about assessment criteria at the University of Oulu webpage.

Grading:

1 - 5

Person responsible:

Mikkola, Outi

Working life cooperation:

-

Other information:

-

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Faculty of Technology
Arvostelu: 1 - 5, pass, fail
Opettajat: Sassali, Jani Henrik, Ursula Heinikoski
Opintokohteen kielet: Finnish
Leikkaavuudet:

030004P	Introduction to Information Retrieval	0.0 op

ECTS Credits:

1 ECTS credit

Language of instruction:

Finnish

Timing:

2nd or 3rd year

Learning outcomes:

Students know the different phases of information retrieval process and basic techniques of scientific information retrieval. They will find the most important reference databases of their discipline and know how to evaluate information sources and retrieval results.

Contents:

Retrieval of scientific information, the retrieval process, key databases of the discipline, and evaluation of information retrieval and information sources.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises in Optima environment, a final assignment on a topic of the student's own choice

Learning activities and teaching methods:

Training sessions 8h, group working 7h, self-study 12h

Target group:

Compulsory for all students of the Faculty of Technology, the Faculty of Information Technology and Electrical Engineering and the Faculty of Architecture. In the Faculty of Science compulsory for students of biology, physics, geosciences, chemistry and geography. Optional for students of biochemistry and mathematics.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Web learning material https://wiki.oulu.fi/display/030005P.

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

pass/fail

Person responsible:

Science and Technology Library Tellus, tellustieto (at) oulu.fi

Working life cooperation:

-

Other information:

-

FOREIGN LANGUAGE(choose one)

902011P: Technical English 3, 6 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Proficiency level:

CEFR B2 - C1

Status:

This course is compulsory for the students who have chosen English as their foreign language. (See the foreign language requirements for your own degree programme.)

Required proficiency level:

English must have been the A1 or A2 language at school or equivalent English skills acquired otherwise. If you need to take English, but lack this background, please get in touch with the Languages and Communication contact teacher for your department to discuss individual solutions.

ECTS Credits:

6 ECTS credits (The workload is 160 hours.)
STUDENTS OF ENGINEERING: The course consists of 3 x 2-ECTS modules.
STUDENTS OF ARCHITECTURE: The course consists of 2 x 3-ECTS modules.

Students with the matriculation exam grade *Laudatur* or *Eximia cum laude approbatur* will be exempted from part of the course (2 ECTS credits).

Language of instruction:

English

Timing:

STUDENTS OF ENGINEERING:
PYO, KO, TuTa: *1st & 2nd* years of studies, beginning 1st year autumn.
SO & CSE: 2nd & 3rd years of studies, beginning 2nd year autumn.
STUDENTS OF ARCHITECTURE:
1st & 2nd years of studies, beginning 1st year spring and continuing 2nd year autumn.

Learning outcomes:

By the end of the course, you will be able to

- demonstrate efficient strategies and methods for developing and maintaining your English proficiency
- communicate using the core vocabulary required for professional language use in your field
- apply language skills, intercultural awareness and presentation techniques necessary for working in a multicultural environment
- use language, culture and communication skills at a B2-C1 CEFR level in accordance with your own professional needs.

Contents:

In this course, you will focus on developing oral and written English language skills which enable you to follow developments in your own professional field and manage successfully in an international, intercultural working environment.

STUDENTS OF ENGINEERING:
The course consists of three modules:

1. first, **Professional English for Technology** (PET, 2 ECTS credits),
2. then **two modules** (2 ECTS credits each) from a free-choice module menu, in which each module has its own content. These modules allow you to develop further skills in specific core areas. Read the module descriptions with care so that you choose modules which match your own needs, interests and level.

   TuTa students, however, take ONE module from the free-choice menu and then, in second year autumn, the Business Plan module, which is integrated with a course in their own department (*555222A Tuotantotalouden harjoitustyöt*) .

STUDENTS OF ARCHITECTURE:
The course consists of two modules:
See the course description of each module (902011P-38 module A and 902011P-39 module B for a detailed explanation of the course content.

Mode of delivery:

STUDENTS OF ENGINEERING: The mode of delivery varies according to the modules you take. See the course descriptions for the individual modules.
STUDENTS OF ARCHITECTURE: face-to-face teaching in the premises of your own department and independent study

Learning activities and teaching methods:

STUDENTS OF ENGINEERING: The teaching methods and learning activities depend on which free-choice modules you choose. See the course descriptions for the individual modules.
STUDENTS OF ARCHITECTURE:
The classroom teaching comprises about 50% of the total student workload for the course and includes mini-lectures, group and teamwork, student presentations. The independent work component comprises online work and independent study in preparation for classroom activities.

Target group:

Students of the Faculty of Technology
- all Engineering Departments
- the Department of Architecture

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Materials will be provided by the teacher.

Assessment methods and criteria:

Assessment methods vary according to the individual modules taken. The assessment criteria are based on the learning outcomes of the module.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

pass / fail.

Person responsible:

Each department in the Technical Faculty has its own Languages and Communication contact teacher for questions about English studies.

Working life cooperation:

-

Other information:

See the Languages and Communication Study Guide, English, TTK.

903012P: Technical German 3, 6 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: German

Ei opintojaksokuvauksia.

CHOOSE ONE

901008P: Second Official Language (Swedish), 2 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Opintokohteen kielet: Swedish
Leikkaavuudet:

ay901008P Second Official Language (Swedish) (OPEN UNI) 2.0 op

Proficiency level:

B1/B2/C1 (Common European Framework of Reference)

Status:

This course is compulsory to all students except those who have at least 60 ECTS credits of Swedish studies in their degrees. The language proficiency provided by the course unit is equivalent to the language

proficiency required of a state official with an academic degree working in a bilingual municipality area (Act 424/03 and Decree 481/03).
According to the requirements of the law, the student must be able to use Swedish both orally and in writing in various professional situations. Achieving this kind of proficiency during a course unit that lasts for only one semester requires that the student has already achieved the necessary starting proficiency level prior to taking the course.

Required proficiency level:

The required starting proficiency level for students of all faculties is a grade of 7 or higher from the Swedish studies at secondary school (B-syllabus) or equivalent knowledge AND a passing grade from the proficiency test held at the beginning of the course unit. Based on this proficiency test the students are directed to brush up on their language skills if it is deemed necessary; mastering basic vocabulary and grammar is a prerequisite to achieving the necessary language proficiency for the various communication situations one faces in professional life.
If a student has not completed Swedish studies (B-language) at secondary school with a grade of 7 or higher, or his/her language skills are otherwise lacking, he/she must achieve the required proficiency level BEFORE taking this compulsory Swedish course.

ECTS Credits:

2 ECTS credits

Language of instruction:

Swedish

Timing:

Students of the School of Architecture: autumn term of 1st year of studies
Studenst of Students of Industrial Engineering and Management : autumn semester of the 2nd year of studies
Students of Process Engineering and Environmental Engineering: autumn or spring semester of the second year of studies
Mechanical Engineering: autumn or spring semester of the third year of studies
The Faculty of Information Technology and Electrical Engineering: Students of Electrical Engineering and Computer Science Engineering: Autumn or spring term of 1st year of studies.

Learning outcomes:

Upon completion of the course unit the student should be able to read and understand texts from his/her academic field and make conclusions based on them. The student should be able to write typical professional emails and short reports. He/she should be able to carry himself/herself according to Swedish etiquette when acting as host or guest. The student should also be able to discuss current events and special field-specific matters, use the vocabulary of education and plan and give short oral presentations relating to his/her own field.

Contents:

Communicative oral and written exercises, which aim to develop the student's Swedish proficiency in areas relevant to his/her academic field and future professional tasks. The student practises oral presentation and pronunciation. Situational exercises done individually and in pairs and groups. Discussions in small groups. Current texts about the student's special field. Written exercises relating to the student's professional field. Practising presentation skills.

Mode of delivery:

Contact teaching

Learning activities and teaching methods:

1 x 90 minutes of contact teaching per week and self-directed study, 53 hours per course.

Target group:

See Timing

Prerequisites and co-requisites:

See Required Proficiency Level

Recommended optional programme components:

-

Recommended or required reading:

Study material will be provided by the teacher.

Assessment methods and criteria:

The course unit focuses on improving both oral and written language skills and requires active attendance and participation in exercises, which also require preparation time. 100% attendance is required. The course unit tests both oral and written language skills.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Oral and written language proficiencies are tested separately and assessed using the so called KORU-criteria (publication of HAMK University of Applied Sciences, 2006). Separate grades will be awarded for the successful completions of both oral and written portions of the course unit: the possible passing grades are **satisfactory skills and good skills** (see language decree 481/03). The grades are based on continuous assessment and testing.

Person responsible:

See contact teachers on the Language and Communication home page http://www.oulu.fi/languagesandcommunication/student_counselling

Working life cooperation:

-

Other information:

Students sign up for teaching in WebOodi. A student can only sign up for one teaching group. When signing up , it is imperative that the student fills in his/her university email address (paju.oulu.fi), major subject and Swedish grades attained during secondary education in the Further Information field. Information in sign-up periods and course unit timetables can be found in WebOodi.

900009P: Second Official Language (Finnish), 2 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Negotiated Education

Opintokohteen kielet: Finnish

Proficiency level:

B1/B2/C2

Status:

This course is compulsory to students who received their schooling in Swedish.
The language proficiency provided by the course unit is equivalent to the language proficiency required of a state official with an academic degree working in a bilingual municipality area (Act 424/03 and Decree 481/03).

Required proficiency level:

Successful completion of the A-syllabus in Finnish (A-finska) during secondary education or equivalent knowledge.

ECTS Credits:

3 credits

Language of instruction:

-

Timing:

Second year of studies

Learning outcomes:

Upon completion of the course the student should have attained the required proficiency level in Finnish to be able to function in his/her studies and professional work tasks. The student should be able to manage in various oral communication situations, read literature from his/her academic field and write fluent texts about his/her special field. The student should also be able to understand standard spoken Finnish as well as Finnish of his/her own special field.

The language proficiency provided by the course unit is equivalent to the language proficiency required of a state official with an academic degree working in a bilingual municipality area (Act 424/03 and Decree 481 /03).

Contents:

Taking the course exam and participating in the teaching, if necessary.

Mode of delivery:

Contact teaching

Learning activities and teaching methods:

The course exam consists of a written section (4 hours) and an oral section (1 hour). 60 hours of contact teaching is arranged for students who fail the exam. Active and regular participation in the teaching is required.

Target group:

Students in the Faculty of Technology who received their schooling in Swedish.

Prerequisites and co-requisites:

Successful completion of the A-syllabus in Finnish (A-finska) during secondary education or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

To be agreed on.

Assessment methods and criteria:

This course is usually completed by taking the course exam held by the Language Centre. The exam tests the student's Finnish language skills: written and oral text production, reading and listening comprehension and special field-specific language skills. Students who fail the exam may attend Finnish language teaching, after which they must retake and pass the exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Separate grades are given for written and oral language skills: the possible passing grades are satisfactory skills and good skills. Satisfactory skills equal B1 proficiency and good skills equal B2 proficiency or higher in the Common European Framework of Reference for Languages (CEFR).

Person responsible:

Anne Koskela

Working life cooperation:

-

Other information:

The written exam is held during the autumn semester. Students sign up for the exam in WebOodi. The date of the oral exam is agreed upon separately. Students must bring a copy of their matriculation examination certificate with them when they come to the exam. If they have completed the Central Government's language proficiency exam, they must bring a copy of that certificate with them as well.

MATHEMATICS

031010P: Calculus I, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Lusikka

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031010P	Calculus I (OPEN UNI)	5.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Autumn semester, periods 1-3.

Learning outcomes:

After completing the course the student identifies concepts of vector algebra and can use vector algebra for solving problems of analytic geometry. The student can also explain basic characteristics of elementary functions and is able to analyse the limit and the continuity of real valued functions of one variable. Furthermore, the student can solve problems associated with differential and integral calculus of real valued functions of one variable.

Contents:

Vector algebra and analytic geometry. Limit, continuity, differential and integral calculus and applications of real valued functions of one variable. Complex numbers.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 55 h / Group work 22 h.

Target group:

-

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Grossmann, S.I.: Calculus of One Variable; Grossmann, S.I.: Multivariable Calculus, Linear Algebra and Differential Equations (partly); Adams, R.A.: A Complete Course Calculus (partly).

Assessment methods and criteria:

Intermediate exams or a final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 1-5.

Person responsible:

Ilkka Lusikka

Working life cooperation:

-

Other information:

-

031078P: Matrix Algebra, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Matti Peltola
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay031078P	Matrix Algebra (OPEN UNI)	5.0 op

031019P Matrix Algebra 3.5 op

Ei opintojaksokuvauksia.

031075P: Calculus II, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Ilkka Lusikka
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay031075P Calculus II (OPEN UNI) 5.0 op
031011P Calculus II 6.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Spring, period 3

Learning outcomes:

The course gives the basics of theory of series and differential and integral calculus of real and vector valued functions of several variables. After completing the course the student is able to examine the convergence of series and power series of real terms. Furthermore, the student can explain the use of power series e.g. in calculating limits and is able to solve problems related to differential and integral calculus of real and vector valued functions of several variables.

Contents:

Sequences, series, power series and Fourier series of real terms. Differential and integral calculus of real and vector valued functions of several variables.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h / Group work 28 h.

Target group:

-

Prerequisites and co-requisites:

The recommended prerequisite is the completion of the course Calculus I.

Recommended optional programme components:

-

Recommended or required reading:

Kreyszig, E.: Advanced Engineering Mathematics; Grossmann, S.I.: Multivariable Calculus, Linear Algebra and Differential Equations.

Assessment methods and criteria:

Intermediate exams or a final exam.

Grading:

Numerical grading scale 1-5.

Person responsible:

Ilkka Lusikka

Working life cooperation:

-

Other information:

-

031076P: Differential Equations, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay031076P	Differential Equations (OPEN UNI)	5.0 op
800320A	Differential equations	5.0 op
031017P	Differential Equations	4.0 op

Ei opintojaksokuvauksia.

031021P: Probability and Mathematical Statistics, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Kemppainen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay031021P	Probability and Mathematical Statistics (OPEN UNI)	5.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Spring semester, periods 4-6

Learning outcomes:

After completing the course the student knows the key concepts of probability and the most important random variables and is able to use them in calculating probabilities and parameters of probability distributions. In addition, the student is able to analyze statistical data by calculating interval and point estimates for the parameters. The student is also able to formulate statistical hypotheses and test them.

Contents:

The key concepts of probability, random variable, parameters of probability distributions, estimation of parameters, hypothesis testing.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 44 h/Exercises 22 h/Self-study 68 h.

Target group:

-

Prerequisites and co-requisites:

The recommended prerequisites are the course 031010P Calculus I and some parts of the course 031011P Calculus II.

Recommended optional programme components:

-

Recommended or required reading:

Milton, J.S., Arnold, J.C. (1992): Introduction to Probability and Statistics.

Assessment methods and criteria:

Intermediate exams or a final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 1-5.

Person responsible:

Jukka Kemppainen

Working life cooperation:

-

Other information:

-

PHYSICS

761111P: Basic mechanics, 5 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761118P Mechanics 1 5.0 op
761118P-02 Mechanics 1, lab. exercises 0.0 op
761118P-01 Mechanics 1, lectures and exam 0.0 op
ay761111P Basic mechanics (OPEN UNI) 5.0 op
761101P Basic Mechanics 4.0 op

ECTS Credits:

5 credits

Language of instruction:

The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.

Timing:

Autumn

Learning outcomes:

The student is able to describe the basic concepts of mechanics and to apply those when solving the problems related to mechanics.

Contents:

We encounter many phenomena related to mechanics in our everyday life. Most engineering sciences are based on mechanics and mechanics forms the basis of many other fields of physics, including modern physics.
Contents in brief: Short summary of vector calculus. Kinematics, projectile motion and circular motion. Newton’s laws of motion. Work and different forms of energy. Momentum, impulse and collisions. Rotational motion and moment of inertia. Torque and angular momentum. Rigid body equilibrium problems. Gravitation. Periodic motion. Fluid mechanics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, 8 exercises (16 h), 2 laboratory exercises (8 h), self-study 77 h

Target group:

For the students of the University of Oulu

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13th edition, 2012, chapters 1-14. Also older editions can be used.
Lecture material: Finnish lecture material will be available on the web page of the course.
Course material availability can be checked here.

Assessment methods and criteria:

Three mini examinations and end examination or final examination
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Anita Aikio

Working life cooperation:

No work placement period

Other information:

https://noppa.oulu.fi/noppa/kurssi/761111P/etusivu

Compulsory

761111P-01: Basic mechanics, lectures and exam, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761118P-01	Mechanics 1, lectures and exam	0.0 op
761118P-02	Mechanics 1, lab. exercises	0.0 op
761101P	Basic Mechanics	4.0 op

Ei opintojaksokuvauksia.

761111P-02: Basic mechanics, lab. exercises, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

761118P-01 Mechanics 1, lectures and exam 0.0 op

761118P-02 Mechanics 1, lab. exercises 0.0 op

761101P Basic Mechanics 4.0 op

Ei opintojaksokuvauksia.

761113P: Electricity and magnetism, 5 op

Voimassaolo: 01.01.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

761119P Electromagnetism 1 5.0 op

761119P-01 Electromagnetism 1, lectures and exam 0.0 op

761119P-02 Electromagnetism 1, lab. exercises 0.0 op

766319A Electromagnetism 7.0 op

761103P Electricity and Magnetism 4.0 op

ECTS Credits:

5 credits

Language of instruction:

The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.

Timing:

Spring

Learning outcomes:

The student is able to describe the basic concepts of electricity and magnetism and to apply those when solving the problems related to electromagnetism.

Contents:

Electromagnetic interaction is one of the four fundamental interactions in physics and many phenomena like light, radio waves, electric current, magnetism and formation of solid matter are based on electromagnetism. The current technological development is largely based on applications of electromagnetism in energy production and transfer, telecommunications and information technology. *Contents in brief:* Coulomb’s law. Electric field and potential. Gauss’s law. Capacitors and dielectrics. Electric current, resistors, electromotive force and DC circuits. Magnetic field, motion of a charged particle in electric and magnetic fields, and applications. Ampère’s law and Biot-Savart law. Electromagnetic induction and Faraday’s law. Inductance and inductors. R-L-C circuits, alternating current and AC circuits.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, 6 exercises (12 h), 2 laboratory exercises (8 h), self-study 81 h

Target group:

For the students of the University of Oulu.

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus are needed.

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13th edition, 2012, chapters 21-31. Also older editions can be used.
Lecture material: Finnish lecture material will be available on the web page of the course.
Course material availability can be checked here.

Assessment methods and criteria:

Three mini examinations and end examination or final examination
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Anita Aikio

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/761113P/

Compulsory

761113P-01: Electricity and magnetism, lectures and exam, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761119P	Electromagnetism 1	5.0 op
761119P-01	Electromagnetism 1, lectures and exam	0.0 op
761119P-02	Electromagnetism 1, lab. exercises	0.0 op
766319A	Electromagnetism	7.0 op
761103P	Electricity and Magnetism	4.0 op
761121P	Physical Measurements I	3.0 op

Ei opintojaksokuvauksia.

761113P-02: Electricity and magnetism, lab. exercises, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761119P	Electromagnetism 1	5.0 op
761119P-01	Electromagnetism 1, lectures and exam	0.0 op
761119P-02	Electromagnetism 1, lab. exercises	0.0 op
766319A	Electromagnetism	7.0 op
761103P	Electricity and Magnetism	4.0 op

Ei opintojaksokuvauksia.

761114P: Wave motion and optics, 5 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761310A Wave motion and optics 5.0 op
761310A-01 Wave motion and optics, lectures and exam 0.0 op
761310A-02 Wave motion and optics, lab. exercises 0.0 op
761104P Wave Motion 3.0 op

ECTS Credits:

5 credits

Language of instruction:

Lectures and exercises in Finnish. Material in English.

Timing:

Spring

Learning outcomes:

The student can classify different types of wave motions and can name the characterizing quantities (wavelength, period, wave speed), can apply geometrical optics to simple mirror and lens systems, can explain the meaning of interference and diffraction and their applications, like using interference to determine wavelength of radiation.

Contents:

Basic course on wave motion, and geometric and wave optics.
Wave motion and propagation. Acoustics. Geometric optics: basic principles, mirrors and lenses. Electromagnetic waves. Wave optics: interference, diffraction, and polarization. Optical instruments. Photometry. Laser.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, exercises 10 h, 2 laboratory exercises (8 h), self-study 83 h

Target group:

The students of the University of Oulu

Prerequisites and co-requisites:

No specific prerequisites

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13th edition, 2008. Also earlier editions can be used.
Course material availability can be checked here.

Assessment methods and criteria:

Three mini examinations and one end examination or a final examination
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:
Ville-Veikko Telkki
Working life cooperation:
No work placement period
Other information:
https://noppa.oulu.fi/noppa/kurssi/761114p/etusivu

Compulsory

761114P-01: Wave motion and optics, lectures and exam, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761310A	Wave motion and optics	5.0 op
761310A-01	Wave motion and optics, lectures and exam	0.0 op
761310A-02	Wave motion and optics, lab. exercises	0.0 op
761104P	Wave Motion	3.0 op
761121P	Physical Measurements I	3.0 op

Ei opintojaksokuvauksia.

761114P-02: Wave motion and optics, lab. exercises, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761310A	Wave motion and optics	5.0 op
761310A-01	Wave motion and optics, lectures and exam	0.0 op
761310A-02	Wave motion and optics, lab. exercises	0.0 op

Ei opintojaksokuvauksia.

COMPUTER SCIENCE

521141P: Elementary Programming, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Mika Oja, Mika Rautiainen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay521141P	Elementary Programming (OPEN UNI)	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5

Language of instruction:

Finnish, the course can be completed in English by answering the lecture questions and doing the programming exercises and the final exercise.

Timing:

Fall, period 1.

Learning outcomes:

Upon completing the required coursework, the student is able to explain the basic programming concepts and structures and to solve problems using these concepts and structures. Moreover, the student is able to implement small programs independently.

Contents:

Basic concepts of programming, basic structures of programming languages, solving problems by programming.

Mode of delivery:

Web-based teaching + face-to-face teaching

Learning activities and teaching methods:

Learning assignments in a web environment. Contact teaching: 20h of exercise groups.

Target group:

1 st year students of computer science and engineering and electrical engineering and other Students of the University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

The course provides a basis for subsequent programming courses.

Recommended or required reading:

Will be announced at the beginning of the course.

Assessment methods and criteria:

The course is completed by passing all learning assignments, programming exercises and a final exercise project.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

pass/fail.

Person responsible:

Mika Oja

Working life cooperation:

-

ECONOMICS

724110P: Introductory Economics, 5 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Oulu Business School
Arvostelu: 1 - 5, pass, fail
Opettajat: Puhakka Mikko
Opintokohteen kielet: Finnish

Leikkaavuudet:

ay724110P	Introductory Economics (OPEN UNI)	5.0 op
721211P	Principles of Economics	10.0 op
721210P	Principles of Economics	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Period A. It is recommended that students complete the course during the first autumn semester.

Learning outcomes:

After completing the course students (i) understand the basic concepts of economics and the rudiments of economic theory, (ii) can explain the determination of resource allocation and prices in a market economy, (iii) know how the aggregate economy operates in the short and long run, and (iv) how economic policy affects the Finnish economy and also the European economy.

Contents:

The course introduces students to the tools and ideas economics uses to describe and explain economic phenomena. The topics include:

- the long-term development of the Finnish and World economy
- basic ideas and principles of economics
- opportunity cost and comparative advantage
- market equilibrium: demand and supply
- how well does market economy work?
- firms and competition in market economy
- aggregate economic activity and its measurement
- business cycles
- monetary and fiscal policy
- economic growth

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

36 lectures including problem sets. Students are expected to do the problem sets on their own and familiarize themselves with the required and recommended materials (93 h). Exam (4 h).

Target group:

Major students in economics and business administration

Prerequisites and co-requisites:

-

Recommended optional programme components:

This course is part of “Introduction to business studies” -module

Recommended or required reading:

Material posted at the webpage. Textbook: N. Gregory Mankiw ja Mark P. Taylor, Economics. 2014. 3. ed. Cengage Learning. Check the availability of course material from this link.
Extra readings: Timothy Taylor, The Instant Economist. Everything You Need to Know About How the Economy Works. 2012. A Plume Book (Penguin), New York NY. Check the availability of course material from this link.
Robert P. Murphy, Lessons for the Young Economist. Ludvig von Mises Institute 2010; http://mises.org/books/lessons_for_the_young_economist_murphy.pdf

Assessment methods and criteria:

Final Exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Mikko Puhakka

Working life cooperation:

-

Other information:

The number of students is limited.

724105P: Management Accounting, 5 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Oulu Business School
Arvostelu: 1 - 5, pass, fail
Opettajat: Janne Järvinen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay724105P	Management Accounting (OPEN UNI)	5.0 op
721172P	Management Accounting	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 credits / 133 hours of work

Language of instruction:

English (course is lectured separately in Finnish and in English).

Timing:

Period C

Learning outcomes:

After passing the course, the student knows the basic cost concepts and the elements of cost accounting systems. Students are also able to apply the basic cost information in the company's decision making and explain which costs should be included in these calculations under different circumstances.

Contents:

Theoretical framework for understanding cost accounting, cost concepts, cost recording, different product costing methods, cost-volume-profit analysis, using cost accounting information in decision making.

Mode of delivery:

Contact teaching

Learning activities and teaching methods:

20 h lectures, 16 h exercises and independent reading of study materials (97 hours).

Target group:

Major students in economics and business administration

Prerequisites and co-requisites:

Earlier module (introduction to business studies)

Recommended optional programme components:

This course is part of "Business Processes" -module

Recommended or required reading:

Drury, C.: Management and cost accounting. Thomson Business Press, 5th ed. 2000 or newer. Chapters 1-13;
Check the availability of course material from this link.
Supplementary material: Järvenpää. M.-Länsiluoto, A.-Partanen, V. –Pellinen, J.: Talousohjaus ja kustannuslaskenta, WSOYpro, chapters 1-8.
Check the availability of course material from this link.

Assessment methods and criteria:

Lectures and literature examination.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor in Management Accounting.

Working life cooperation:

-

Other information:

The number of students is limited.

555213A: Sales and marketing, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course the student should be able to understand and apply basic terminology of sales and marketing and the fundamentals of customer oriented approach. He/she can recognize modern sales and marketing process phases, plan product and service offerings for a particular customer segment, and create sales and marketing plan. The student can explain the following concepts: sales pipeline, segmentation, marketing mix, value proposition and branding. He/she is able to listen and develop a customer’s need, and present and defend one’s own value proposition.

Contents:

Customer’s buying behavior, planning product and service offerings, communicating value, basics of sales and marketing, digital marketing, customer oriented approach, sales and marketing processes and plans, sales pipeline, segmentation, value proposition, marketing mix and branding.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures and exercises 18 h / group work 79 h / self-study 37 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 724105P Management accounting or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Parvinen, P. (2013) Myyntipsykologia: Näin meille myydään. Docendo Oy. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are lecture and home assignments (50 % of the grade) and a group work (50 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes couses 721412P Product and Market Strategies (2013 - 2014) and 724106P Principles of Marketing (2014 - 2015)

IEM STUDIES

555225P: Basics of industrial engineering and management, 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay555225P	Basics of industrial engineering and management (OPEN UNI)	5.0 op
555221P	Introduction to Production	2.0 op
555220P	Basic Course in Industrial Engineering and Management	3.0 op

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course the student should be able to describe what operations management means. The student can explain the core concepts of business operations and utilize these concepts in describing and analyzing organizational operations. In addition, he/she can explain in general terms the factors that affect economic performance of organizations. The student is able to utilize the terminology

used in operations management, describe the financial processes of companies and based on this describe the use of cost accounting in organizational decision-making. The student can also calculate unit costs in various simplified settings, calculate various alternatives, as well as perform planning and goal oriented calculations based on given data, and draw conclusions based on the calculation results.

Contents:

Operations and productivity, operations strategy, forecasting, cost accounting, investments, sustainability, capacity management, location decisions, layout strategies, human resources management, supply chain management, subcontracting, inventory management, production planning, MRP & ERP, production scheduling, Just-in-Time & Lean operations, maintenance.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Web-based lectures 20 h / exercises 18 h / self-study 96 h.

Target group:

: Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

No prerequisites exist.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management.

Recommended or required reading:

Lecture and exercise materials. Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are nine mandatory weekly assignments. At least half of the assignments must be passed.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes courses 555220P Basic Course in Industrial Engineering and Management 3 ECTS cr and 555221P Introduction to Production 2 ECTS cr.

555285A: Project management, 5 op

Voimassaolo: 01.01.2014 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Kirsi Aaltonen

Opintokohteen kielet: Finnish

Leikkaavuudet:

555288A	Project Management	5.0 op
ay555285A	Project management (OPEN UNI)	5.0 op
555282A	Project Management	4.0 op
555280P	Basic Course of Project Management	2.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material may also be used.

Timing:

Period 1.

Learning outcomes:

The objective of the course is to familiarise the student with the basics and the basic methods of project management. Upon completion the student can explain the essential concepts related to project management. He/she can present the main features of a project plan and can use different methods of partitioning a project. The student can also schedule a project and estimate its costs. The student can explain the terms related to Earned value method and can apply the method on simple tasks. Upon completion the student recognizes the essential tasks of project risk management.

Contents:

Defining project management, project planning, organising and scope management, schedule management, cost management, earned value calculation and project risk management, project stakeholder management.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures or web-based lectures 16h, self-study 118h

Target group:

Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

No prerequisites exist.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes555225P Basics of industrial engineering and management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management.

Recommended or required reading:

Lecture material, exercise book, Artto, Martinsuo & Kujala 2006. Projektiliiketoiminta. WSOY

Assessment methods and criteria:

The course includes three mandatory assignments, exercise book and exam. The course grading is based on the exam. Well completed assignments and exercise book may raise grading.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jaakko Kujala.

Working life cooperation:

No.

Other information:

Substitutes courses 555280P Basic Course of Project Management + 555282A Project Management.

555265P: Occupational Safety and Health Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Henri Jounila
Opintokohteen kielet: Finnish
Leikkaavuudet:

555263A	Technology, Society and Work	2.0 op
555260P	Basic Course in Occupational Safety and Wellbeing at Work	3.0 op

Required proficiency level:

ECTS Credits:

5,0 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 3-4.

Learning outcomes:

After the course the student is capable of explaining basic terms of occupational safety and health. He/she is able to assess the importance of occupational safety, health and well-being at work. In addition, he/she is able to assess the significance of occupational safety in the improving of productivity and quality. He/she can apply different safety analysis. Upon completion of the course the student is familiar with the core issues of occupational safety and health management.

Contents:

Occupational safety and health, safety management, safety culture, laws and standards, hazards and risks, occupational diseases and work accidents, safety analysis, occupational safety at shared industrial work sites, occupational safety card, HSEQ-assessment procedure, other current issues.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures and assignments 26 h / group work 40 h / self-study 68 h.

Target group:

Industrial Engineering and Management, Mechanical Engineering, Process Engineering and Environmental Engineering students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined during the course.

Assessment methods and criteria:

The grading is based on the exam (50 % of the grade) and exercises (50 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Henri Jounila

Working life cooperation:

No.

Other information:

Substitutes courses 555260P Basic Course in Occupational Safety and Wellbeing at Work + 555263A Technology, Society and Work.

555226A: Operations and Production, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: English
Leikkaavuudet:

555222A	Demonstration in Industrial Engineering and Management	2.0 op
555223A	Introduction to Production Control	3.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

English.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course the student should be able to describe different production types. He/she can apply different forecasting methods, plan needed production capacity, and apply location and transportation decisions related methods. The student can master common inventory management methods and aggregated and short-term scheduling. The student can also create a sales and operations plan for a company.

Contents:

Production types, forecasting methods, capacity planning and queuing models, location and transportation decisions, inventory management systems, aggregate scheduling, MRP & ERP, short-term scheduling, linear programming.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 20 h / self-study (web-based exercises) 60 h / group work 54 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management or similar knowledge.

Recommended optional programme components:

Industrial Engineering and Management students will complete 902143Y English course simultaneously.

Recommended or required reading:

Lecture and exercise materials. Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson. Krajewski, L.J. et al. (2012) Operations management: processes and supply chains, 10th ed. Pearson.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are mandatory weekly assignments. At least half of the assignments must be passed. 40 % of the grade is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555222A Demonstration in Industrial Engineering and Management 2 ECTS cr and 555223A Introduction to Production Control 3 ECTS cr.

555264P: Managing well-being and quality of working life, 5 op

Voimassaolo: 01.01.2014 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay555264P	Managing well-being and quality of working life (OPEN UNI)	5.0 op
555261A	Basic Course in Occupational Psychology	3.0 op
555262A	Usability and Safety in Product Development	3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish.

Timing:

Periods 3-4.

Learning outcomes:

After the course the student is capable of using the central concepts related to well-being at work, can set targets for it, and is able to choose appropriate methods from the management and personal career point of views. Furthermore, the student is able to develop well-being at work in the contexts of labour legislation, good practices, productivity, occupational safety expertise, management and human resources. The student can utilise basic knowledge, search for more information and knows the key players in the field. Also, the student knows the key sources of information, typical goal-setting and management practices and the methods for assessing the performance of an individual employee, supervisor, company and entrepreneur. The student can assess the impact of well-being at work from the economic perspective, especially in cases of work ability, occupational health, job satisfaction, occupational safety, productivity and the overall quality of working life. The student knows essential national and international regulation and strategic goal setting practices, good practices of the case companies, current trends, and methods in research. In brief, the focus of the course is to learn key factors for guaranteeing successful contribution of humans in issues of production.

Contents:

The course gives the student a vision of building sustainable, productive and satisfactory career for the work community he/she leads - and for himself/herself as an employee or a supervisor. The contents cover the whole area of basic quality issues of working life analysing them in the following framework "Well-being at work means safe, healthy, and productive work in a well-led organisation by competent workers and work communities who see their job as meaningful and rewarding, and see work as a factor that supports their life management".

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 22 h / self-study 100 h / group work & exercises 12 h.

Target group:

Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

No prerequisites exist.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial Engineering and Management that also includes 555225P Basics of industrial engineering and management**,** 555285P Project Management, 555242A Product development, and 555286A Process and quality management.

Recommended or required reading:

Essential background information can is available from Arnold, J. et al. (2010), Work Psychology; Understanding Human Behaviour in the Workplace. 5th Edition. Financial Times/Prentice Hall. Other literature will be informed during the course.

Assessment methods and criteria:

This course utilizes continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Seppo Väyrynen

Working life cooperation:

No.

Other information:

Lecturers: Seppo Väyrynen and Henri Jounila along with visiting lecturers and exercise supervisors. Substitutes courses 555261A Basic Course in Occupational Psychology + 555262A Usability and Safety in Product Development.

555286A: Process and quality management, 5 op

Voimassaolo: 01.01.2014 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Osmo Kauppila

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay555286A	Process and quality management (OPEN UNI)	5.0 op
555281A	Basic Course of Quality Management	5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish.

Timing:

Period 4.

Learning outcomes:

Upon completion the student is able to explain the role of process and quality management in a business organization. The student is capable of developing business processes based on the principles of quality management and appropriate tools.

Contents:

Foundations of total quality management, planning of quality, performance measurement, process management, people management in relation to quality management, implantation of total quality management.

Mode of delivery:

The tuition will be implemented as face-to-face teaching (integrated classroom lectures and exercises).

Learning activities and teaching methods:

20 h lectures, 114 h independent study including tutored group work.

Target group:

Industrial Engineering and Management students and other students studying Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

-

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes 555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, and 555264P Managing well-being and quality of working life.

Recommended or required reading:

Oakland, J.S. (2014) Total quality management and operational excellence (4th ed.). Routledge, 529 pp. and material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must pass the course exam and complete the classroom exercises and the group work. The course grade is calculated based on the exam and group work grades.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555281A Basic Course of Quality Management.

555204A: Internship, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Practical training
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555210A Practice 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish.

Timing:

Periods 1-4.

Learning outcomes:

The objective is to familiarise students to industrial engineering and management in practical work life. During the course, students learn to observe his/her working environment from theoretical viewpoints of Industrial Engineering and Management (IEM). From the working environment, the student is able to identify IEM themes and classify them. The student is able to select theoretical references relevant for the topic and is able to evaluate the working environment based on the theoretical references. The student is able to draw up a report based on given instructions.

Contents:

To be defined by the student.

Mode of delivery:

Students will write a report concerning summer job. The length of the summer job has to be 2 months minimum.

Learning activities and teaching methods:

Students will write a report concerning summer job. Student’s personal Omaope will review and grade the report.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

Writing the written report is integrated with the course 900061A Scientific Communication for Production Engineering and Management.

Recommended or required reading:

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Assessment methods and criteria:

The Report.

Grading:

Fail/Pass

Person responsible:

Tutor teacher.

Working life cooperation:

Yes

Other information:

Substitutes course 555210A Practice.

555242A: Product development, 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

ay555242A	Product development (OPEN UNI)	5.0 op
555240A	Basic Course in Product Development	3.0 op

ECTS Credits:

5 ECTS credits**.**

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

This course introduces product development and innovations management in a company environment. The course 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. Upon completion of the course 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. Student learns how to

transform customer needs into requirements for product development process and finally into product features. 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 (U&E model, Cooper's stage-gate model, QFD), managing innovations, and product development success factors.

Mode of delivery:

The tuition will be implemented as blended teaching.

Learning activities and teaching methods:

Lectures 20 h / exercises 6 h / group work and self-study 108 h.

Target group:

Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

555226A Operations and production.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes 555225P Basics of industrial engineering and management, 555285A Project management, 555264P Managing well-being and quality of working life, and 555286A Process and quality management..

Recommended or required reading:

Handouts, course work, and a collection of articles. Ulrich, K. & Eppinger, S. (2008) Product Design and Development. McGraw-Hill. 358 p.

Assessment methods and criteria:

Assignment and final exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555240A Basic Course in Product Development.

555287A: Problem Solving in Business Cases, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Leikkaavuudet:

555284A Problem Solving in Business Cases 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion the student can systematically analyse the challenges related to a company's business as a part of a group, apply problem solving tools and processes to develop and present alternative solutions to business challenges related to strategy or operations. The student is able to analyse and develop the functioning of a group. The student is able to evaluate and improve his/her presentation skills.

Contents:

problem solving tools and processes, team work, presentations skills, topical challenges related to business strategy and operations.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 36h, self-study 36h, group exercise 62h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555264P Managing well-being and quality of working life, and 555286A Process and quality management.

Recommended optional programme components:

The students will complete 900062P Tuotantotalouden suullinen viestintä course simultaneously.

Recommended or required reading:

Lecture material. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. Learning diary and participation in lectures, each group exercise in case solving and designing a case will be evaluated. 70% of the grade is based on group exercises.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jaakko Kujala.

Working life cooperation:

No.

Other information:

Substitutes course 555284A roblem Solving in Business Cases.

A440146: Module Preparing for the Major, Medical and Wellness Technology, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440129: Module Preparing for the Major, Medical and Wellness Technology, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

521109A: Electrical Measurement Principles, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Saarela
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Course is lectured in Finnish. Laboratory exercises and the exam can be done in English.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course, students are able to measure basic measurements with a ammeter, voltmeter and oscilloscope. They can operate signal and function generators. They can estimate the validity of their measurements.

Contents:

Units of measures, standards of measures, analysis of errors, most commonly used analog and digital measuring methods, equipment and electrical safety regulations.

Mode of delivery:

Pure face-to-face teaching.

Learning activities and teaching methods:

Lectures 20h, laboratory exercises 16 h and self-study 100h.

Target group:

Course is compulsory for electrical engineering, information engineering and wellness technology students.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

None.

Recommended or required reading:

Kurssimateriaali Optimasta.

Assessment methods and criteria:

Exam and passed lab exercises.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grade is based on exam and grade is on numerical scale 1-5.

Person responsible:

Juha Saarela

Working life cooperation:

None.

Other information:

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580102P: Introduction to Medical and Wellbeing Technology, 5 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credit points / 135 hours of work

Language of instruction:

Finnish

Timing:

1st year, autumn

Learning outcomes:

The student can define areas of medical technology and can list technological innovations used in these fields. The student can describe milestones in medical technology from history to present time.

Contents:

Practical examples of medical and wellness technology, introducing terms. Group work based on the material given and presenting the results. Includes also material introduced during theme day.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures, demonstrations and excursions 30h / Group work and theme day 30h / Self-study 75h. Final exam or assignment.

Target group:

1st year students of Medical and Wellness Technology, minor subject students

Recommended or required reading:

Given material.

Assessment methods and criteria:

Participating in the contact teaching, group work and theme day. Final exam or assignment.

Grading:

The course utilizes grading: pass or fail

Person responsible:

University lecturer Riikka Ahola

Working life cooperation:

No

764163P: Basic biophysics, 5 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

764163P-01	Basic biophysics (part 1): Introduction to biophysics	0.0 op
764163P-02	Basic biophysics (part 2)	0.0 op
764103P	Introduction to biophysics	2.0 op
764162P	Introduction to biophysics	3.0 op

ECTS Credits:

5 credits *(part 1, Introduction to biophysics 2 credits and part 2, Basic biophysics 3 credits)*

Language of instruction:

Finnish

Timing:

Part 1: 1st autumn
Part 2: 1st spring

Learning outcomes:

Student can describe and explain some basics and concepts of certain areas of biophysics and knows central targets of biophysical research.

Contents:

The course introduces some basic biological processes from biophysics point of view, and describes so called systems thinking, biophysics and its methods, models and system analysis; for example basics of cellular and molecular biophysics, fluid flow phenomena, biomechanics and some other special issues.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Part 1: Lectures 14 h, self-study 39 h
Part 2: Lectures 20 h, final exam, 46 h of independent studies

Target group:

Mainly students in Physics B.Sc. program. Also for the other students of the University of Oulu.

Prerequisites and co-requisites:

No specific prerequisites

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously

Recommended or required reading:

Part 1: Lectures and lecture notes
Part 2: Lectures, lecture notes.

Assessment methods and criteria:

Part 1: Exam
Part 2: Exam
Both parts of the course have their own separate examinations. The final grade of the course is the weighted average of the grades of part 1 (2 cp) and part 2 (3 cp).
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Kyösti Heimonen, Marja Hyvönen, Matti Weckström

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/764163P/

ay402961P: Basics of Anatomy and Physiology (OPEN UNI), 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Open University, Oulu
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: Open University, Oulu
Opintokohteen kielet: Finnish
Leikkaavuudet:

402961P	Basics of Anatomy and Physiology	5.0 op

ECTS Credits:

6 credits

Language of instruction:

Finnish

Learning outcomes:

Having completed the course, the student knows how to

- explain the structure and operation of eukaryotic cells
- explain the construction of tissue from different types of cell and matrix
- explain the structure and cooperation of different organ systems

Contents:

- structure of cells and tissue
- liquid states and electolytes of the organism
- nervous system and sense organs
- hormones
- sensor and motor activity
- respiration
- blood circulation
- nutrition
- metabolism

Mode of delivery:

Online studies

Target group:

Minor subject student in all faculties

Prerequisites and co-requisites:

none

Recommended optional programme components:

Other courses in Health Education

Recommended or required reading:

Bjålie, J. G. et al. (1999). Ihminen. Fysiologia ja anatomia. Porvoo, WSOY.
OR
Leppäluoto, J. et al. (2008) Anatomia ja fysiologia – Rakenteesta toimintaan. Porvoo, WSOY.
You can check for the availability of course books here.

Assessment methods and criteria:

Participation in teaching and independent written assignment
Read more about assessment criteria at the University of Oulu webpage.

Grading:

0-5

Person responsible:

Johanna Veijola

Working life cooperation:

None

Other information:

Biology subject teacher students who have passed Basics of Anatomy and Physiology course as a base for the qualifying studies for the biology subject teacher studies should take course ay402965P Special Course in Health Sciences instead (Open University).

041201A: Basics in eHealth, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Jarmo Reponen

Opintokohteen kielet: English

Leikkaavuudet:

ay041201A	Basics in eHealth (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS credit points / 135 hours of work

Language of instruction:

English

Timing:

2nd year autumn

Learning outcomes:

The student can define central information and communication technological terms and solutions in healthcare, and can list respective applications in healthcare services and training.
The student can evaluate the societal and economic significance of information and communication technology in healthcare

Contents:

- terms and concepts
- societal dimensions
- delivery of health services
- electronic patient records
- data transfer within the health care system
- data transfer between the health care professionals and the patients
- remote consultations, radiologypsychiatry, teleradiology, telepsychiatry
- economical and functional assessment
- remote education
- future visions of health care information systems

Mode of delivery:

Web-based teaching

Learning activities and teaching methods:

Interactivity takes place in virtual learning environment Optima. The course consists of video-taped lectures, power point-presentations and links to other material available in the web. Performance of duties includes an essay, exam, participating in discussions on the grounds of the lectures.
Web lectures 15h / Web exam 40h / Written essay 40h / Self-study and participation to web discussion 40h

Target group:

Students of Medical Technology (medical and wellness technology, biomedical engineering, biophysics, other degree programs), Students of Health Sciences and information technology and everyone who is interested

Recommended or required reading:

All recommended or required reading are offered in Optima virtual learning environment

Assessment methods and criteria:

Web tasks, an essay and final exam

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jarmo Reponen

Working life cooperation:

No

Other information:

Recommended literature:
Graig J Wootton R, Patterson V (Eds): An introduction to Telemedicine,RSM Press 2006
Hämäläinen P, Reponen J, Winblad I, Kärki J, Laaksonen M, Hyppönen H, Kangas M (2013) eHealth and eWelfare of Finland, Check point 2011. THL Report 5/ 2013. (https://www.julkari.fi/bitstream/handle/10024/104368/URN_ISBN_978-952-245-835-3.pdf?sequence=1)
Saranto K, Korpela M (toim) Tietotekniikka ja tiedonhallinta sosiaali- ja terveydenhuollossa, WSOY, Porvoo-Helsinki-Juva 1999
Winblad I, Reponen J, Hämäläinen P (2012) Tieto- ja viestintäteknologian käyttö terveydenhuollossa vuonna 2011. Tilanne ja kehityksen suunta. [English summary] THL Raportteja 3/2012. (http://www.julkari.fi/bitstream/handle/10024/80372/825d0af8-f97c-4192-bf5b-ba5e1bf773aa.pdf?sequence=1)

Journals:
Journal of Telemedicine and Telecare
Telemedicine and e-Health
In addition: eLibrary in the Optima comprising updating of the topics of the lectures and some selected essays (by permission of the author)

080901A: Introduction to Technology in Clinical Medicine, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credit points / 135 hours of work

Language of instruction:

Finnish

Timing:

2nd year, autumn

Learning outcomes:

The student can list technologies in different fields of medical technology, can describe the working principle of these technologies and evaluate the advantages and limitationc of the technologies.

Contents:

Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Initial exam. Lectures 30 h / Demonstrations 10 h / Written work 10h / Self-study 85h. Final exam which is based on lectures and all to the given materials.

Target group:

Students of Medical Technology (medical and wellness technology, biophysis, other degree programs)

Recommended or required reading:

Boook of initial exam T. Sora, P. Antikainen, M. Laisalmi, S. Vierula: Sairaanhoidon teknologia, WSOY 2002. The material addressed during the lectures.

Assessment methods and criteria:

Initial exam and written work. Taking part in the lectures and demos. Final exam which includes essays. To participate to the final exam initial exam and written work has to be accepted.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University lecturer Riikka Ahola

Working life cooperation:

No

521302A: Circuit Theory 1, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Rahkonen, Timo Erkki

Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Finnish. Exams can be arranged in English on demand.

Timing:

Spring, period 4

Learning outcomes:

After the course the student can

- write and solve the equations describing the operation of a given electrical circuit
- solve the sinusoidal steady-state solution using complex phasor arithmetics
- solve time responses of electric circuits
- simplify electrical circuits e.g. using equivalent circuits
- simulate simple circuits and choose an appropriate circuit simulation method

Contents:

Equation of basic circuit elements, circuit laws and systematic building of network equations. Calculation of time and frequency responses. Use of complex phasor arithmetics. Basics of the use of circuit simulators.

Mode of delivery:

Classroom.

Learning activities and teaching methods:

30h lectures, 22 h exercises, and a simulation exercise.

Target group:

Finnish BSc students.

Prerequisites and co-requisites:

Matrix algebra, complex arithmetics, differential equations.

Recommended optional programme components:

-

Recommended or required reading:

Nilsson, Riedel: Electric Circuits (6th or 7th ed., Prentice-Hall 1996), Chapters 1-11.

Assessment methods and criteria:

Final exam. Also the simulation exercise must be passed.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5

Person responsible:

Prof. Timo Rahkonen

Working life cooperation:

-

Other information:

-

761116P: Radiation physics, biology and safety, 3 op

Voimassaolo: 03.12.2010 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

766116P-01	Radiation physics, biology and safety, exam	0.0 op
766116P	Radiation physics, biology and safety	5.0 op

766116P-02 Radiation physics, biology and safety, laboratory exercises 0.0 op
761117P Radiation physics 2.0 op
764117P Physics, Biology and Safety Radiation 3.0 op

ECTS Credits:

3 credits

Language of instruction:

Finnish

Timing:

2nd or 3rd spring

Learning outcomes:

After finishing the course the student is able to describe the physical mechanisms giving rise to different kinds of radiation and explain the essential effects of ionising radiation function on biological organisms. In addition, the student remembers the essential features of radiation safety and laws and regulations (in Finland) concerning this.

Contents:

The topics of the course include the origin of ionizing radiation e.g. as a result of radioactive decay and in nuclear reactions, the interaction between radiation and matter, the detection and measurements of radiation, physical quantities and measuring units related to radiation, radiation in the environment, and examples of utilizing radiation. The biologic effects of radiation and the legislation on radiation safety are also discussed.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 26 h, exercises 8 h, self-study 46 h

Target group:

Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu. The course is also part of the training of a director in charge of radiation use. The training is organized by the Radiation and Nuclear Safety Authority.

Prerequisites and co-requisites:

No specific prerequisites

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously

Recommended or required reading:

Lecture notes, required law texts (in Finnish)

Assessment methods and criteria:

One written exam
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Seppo Alanko and Sakari Kellokumpu

Working life cooperation:

No work placement period

Other information:

https://noppa.oulu.fi/noppa/kurssi/761116p/etusivu

A440145: Module Preparing for the Major, Mining Technology and Mineral Processing, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440128: Module Preparing for the Major, Mining Technology and Mineral Processing, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

477011P: Introduction to Process and Environmental Engineering I, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Aki Sorsa, Sanna Taskila
Opintokohteen kielet: Finnish
Leikkaavuudet:

470219A Introduction to Process Engineering 3.5 op

ECTS Credits:

5 ECTS /133 hours of work

Language of instruction:

Finnish

Timing:

Implementation during periods 1-2 on the autumn term

Learning outcomes:

The objective of this course is to give insight to the whole perspective of process and environmental engineering and to familiarise the students with the terminology involved. In addition, the objective is also to outline the connections between process and environmental engineering and other fields closely related to them.
After the course, the student can analyse the process and environmental engineering aspects of an industrial process. He/She can, for example, divide the process into unit processes, analyse the process or a chain of processes based on the material balances, identify and evaluate the significance of essential mechanical, chemical and transport phenomena, analyse the control and process design aspects of a process etc. He/She can also evaluate the significance of different aspects of process and environmental engineering to the overall production system when these aspects are further examined in forthcoming courses.

Contents:

The course is divided into the next eight separate themes: 1. Unit processes and material balances. 2. Environmental impacts and their classification. 3. Mechanical phenomena. 4. Momentum, heat and mass transfer phenomena. 5. Chemical reactions and reactors. 6. The possibilities of biological process engineering. 7. Process dynamics and control. 8. Process measurements and measurability.

Mode of delivery:

Group work and contact lectures supporting those

Learning activities and teaching methods:

Assignments (8 altogether) carried out in small groups and contact lectures supporting them (16 hours)

Target group:

Bachelor's degree students in the study fields of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

The course serves as an introduction to the studies in process and environmental engineering

Recommended or required reading:

The material is provided during the contact lectures and through the course webpages. It is also expected that the students seek material for completing the assignments independently.

Assessment methods and criteria:

The assignments (altogether 8) covering the course themes carried out in small groups.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilises a numerical grading scale 1-5 and fail.

Person responsible:

Dr Aki Sorsa

Working life cooperation:

No

Other information:

The assessment method utilized requires the active attendance to the group work and contact lectures from the beginning of the course

477201A: Material and Energy Balances, 5 op

Voimassaolo: 01.08.2005 - 31.12.2019
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tiina Leiviskä
Opintokohteen kielet: Finnish
Leikkaavuudet:

477221A	Material and Energy Balances	5.0 op
470220A	Fundamentals of Chemical Process Engineering	5.0 op

ECTS Credits:

5 ECTS /133 hours of work

Language of instruction:

Finnish. The course can be completed in English as a book examination.

Timing:

Autumn period 1

Learning outcomes:

The student is able to formulate material and energy balances for a process by taking into account the restrictions set by reaction stoichiometry. The student knows how the created mathematical formulation can be exploited in process consideration.

Contents:

Formulation of material and energy balances by taking into account the effects of chemical reactions.

Mode of delivery:

Lectures and group exercise

Learning activities and teaching methods:

Lectures 40h, group work 10h and self-study 80h

Target group:

Bachelor students in of Process or Environmental Engineering

Prerequisites and co-requisites:

Basics from the course Introduction to Process Engineering

Recommended optional programme components:

-

Recommended or required reading:

Reklaitis, G.V.: Introduction to Material and Energy Balances. John Wiley & Sons, 1983. ISBN 0-471-04131-9.

Assessment methods and criteria:

During the course, there are two intermediate exams and both of them must be passed. Alternatively student can participate in final exam after the course. In addition to this, the students will be making a group exercise, which will be evaluated.
Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Dr Tiina Leiviskä

Working life cooperation:

No

Other information:

-

477401A: Thermodynamic Equilibria, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Eetu-Pekka Heikkinen
Opintokohteen kielet: Finnish
Leikkaavuudet:

470611A	Metallurgy Processes	7.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the autumn semester, during period II. It is recommended to complete the course at the 2nd year of Bachelor's studies.

Learning outcomes:

Student is capable of defining chemical equilibria of the systems that are related to industrial processes and understands the relevance of equilibria (and their computational determination) as a part of process analysis, planning and control. Additionally, (s)he can define a meaningful system to be considered in computation thermodynamics; i.e. (s)he can create a computationally solvable problem based on technical problem that in itself is not solvable computationally.

Contents:

Concepts of entalphy (H), entropy (S) and Gibbs free energy (G). The effect of temperature and pressure on H, S and G. Chemical and phase equilibria. Activity and activity coefficient. Calculation of thermodynamic equilibria using equilibrium constant as well as Gibbs free energy minimisation.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Lectures, software exercise as well as other exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

'Basic Principles in Chemistry' and 'Material and Energy Balances' as prerequisities

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a education that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Material will be distributed during lectures and exercises.

Assessment methods and criteria:

Students are required to make a portfolio consisting of a learning diary and exercices. Please note that the course is organised only in Finnish.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University Lecturer Eetu-Pekka Heikkinen

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun. Course webpage (in Finnish): http://www.oulu.fi/pyomet/477401a.

488010P: Introduction to Process and Environmental Engineering II, 5 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Fabritius, Timo Matti Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

488011P Introduction to Environmental Engineering 5.0 op
477012P Introduction to Automation Engineering 5.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the spring semester, during periods III and IV. It is recommended to complete the course at the 1st spring semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. material management, phenomenon-based considerations and automation) and they recognize the role of different areas of the process and environmental engineering, when these areas are considered in the forthcoming courses.

Contents:

1. Environmental thinking and industrial ecology. 2. Materials in production processes. 3. Water resources and land use. 4. Municipal and industrial water supply. 5. PI diagrams. 6. Process design. 7. Control and operation of processes.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Group exercises and contact-education (14 h) that supports these exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

This course is an introduction to the other courses of process and environmental engineering

Recommended or required reading:

Material will be distributed during lectures and via course www-site

Assessment methods and criteria:

Group exercises. Please note that the course is not available in English, but only in Finnish. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Timo Fabritius

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun.

477051A: Automation Engineering, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477601A Process Automation Systems 4.0 op

ECTS Credits:

5 ECTS /133 h of work

Language of instruction:

Finnish

Timing:

Autumn, period 1

Learning outcomes:

Students learn how to use PI diagrams, field instruments, automation systems and PLCs in design, implementation and commissioning projects. Students can configure and program the basic automation functions in DCSs and PLCs

Contents:

The operational and structural descriptions and concepts of process automation, automation commissioning projects, PI diagrams and field devices, configuration tools for automation functions, logic programming, telecommunication technology in automation, field buses, examples of commercial DCSs, PLCs and field bus systems

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures, demonstrations, configuration and logic programming exercises, excursion to a neighbouring industrial plant

Target group:

B.Sc. students in process and environmental engineering

Prerequisites and co-requisites:

477011P Introduction to process and environmental engineering I and 448010P Introduction to process and environmental engineering II are recommended

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes and handouts, manuals/handbooks

Assessment methods and criteria:

Learning diary or examination

Grading:

Numerical grading scale 1-5 or fail

Person responsible:

Jukka Hiltunen and Aki Sorsa

Working life cooperation:

No

Other information:

-

477322A: Heat and Mass Transfer, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477323A	Mass and Heat Transfer	5.0 op
477302A	Heat Transfer	3.0 op
477303A	Mass Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Implementation in autumn semester during 1 st period. It is recommended to complete the course at the third (Bachelor's) autumn semester. The course will be lectured first time in autumn 2016.

Learning outcomes:

After passing the course the student knows what happens when heat is transferred by conduction, convection and radiation. The student can describe energy transfer with differential energy balances connected with momentum balances; In macro scale the student is able to solve practical heat transfer problems by correlating heat transfer coefficients to dimensionless flow and material characteristics; With the help of these transfer coefficients the student is capable of estimating the size of heat transfer equipment, especially heat exchangers and select the most suitable and profitable types; and to Sketch large heat nets and to diminish the costs of the equipments.
The student is able to use the pinch method which optimises the number of heat exchangers and total energy consumption. He/she is also able to apply the exergy principle to make work from thermal energy. With the aid of this principle he/she will be able to divide the costs of the used energy in right proportion based on the processing stage. He/she student is able to explain diffusion as a phenomenon and the factors affecting it. He/she is able to model mass transfer in simple systems by using the theory of Fick. The student is capable of modeling diffusion by differential mass balances. He/she recognises the special features of mass transfer in turbulent systems and the role of different transport phenomena in mass transfer equipment. He/she has rudimentary practical skills applicable to the scale-up of the equipment used for absorption.

Contents:

Mechanism of heat transfer. Creating and solving differential energy balances. Heat transfer coefficient. Macroscopic balances. Selection of a proper type of heat exchanger.Scale-up and design of a heat exchanger.Design of heat exchanger networks using pinch technology.Exergy analysis for the heat flows. Diffusion. The Fick law of diffusion. Mass transfer in simple systems. Differential mass balances. Models of mass transfer in turbulent systems. Interphase mass transfer. Absorption.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

(Will be announced later)

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Kaisu Ainassaari

Working life cooperation:

No

Other information:

-

477304A: Separation Processes, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Muurinen, Esa Ilmari, Ainassaari, Kaisu Maritta

Opintokohteen kielet: Finnish

Leikkaavuudet:

470323A	Separation Processes	5.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in autumn semester during 2 nd periods. It is recommended to complete the course on the third (Bachelor's) autumn semester.

Learning outcomes:

After the course the student is able to define the position of separation processes based on mass transfer in process and environmental engineering. He/she is capable of solving phase equilibrium problems in multistage separations for binary mixtures. The student is able to explain the phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation, membrane separations, and reactive separations. He/she recognises the equipment used for these processes and is able to compare the methods to each other with heuristic rules.

Contents:

Separation processes based on mass transfer in process and environmental engineering. Phase equilibrium problems in multistage separations for binary mixtures. Phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation, membrane separations, and reactive separations. Equipment used for these processes and is able to compare the methods to each other with heuristic rules, etc.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 40 h, exercises 20 h, homework 15 h and self-study 58 h. For foreign students written examination based on given literature and homework.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Courses 477301A Momentum Transfer, 477302A Heat Transfer and 477303A Mass Transfer or 477052A Fluid Mechanics and 477312A Heat and Mass Transfer are recommended beforehand.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Seader, J.D., Henley, E.J. & Roper, D.K.: Separation Processes Principles. Wiley 2011, 821 p.; Noble, R.D. & Terry, P.A.: Principles of Chemical Separations with Environmental Applications. Cambridge 2004, Cambridge University Press.321 p.

Assessment methods and criteria:

Homework assignments affect the course grade. Examination. The course can be completed with two intermediate exams or one final exam. Homework assignments affect the course grade. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi /english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Laboratory manager Dr Esa Muurinen

Working life cooperation:

No

Other information:

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477052A: Fluid Mechanics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477301A	Momentum Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in spring semester during 3 rd period. It is recommended to complete the course at the second (Bachelolor's) spring semester. The course will be lectured first time in spring 2016.

Learning outcomes:

After the course the student is able to determine the viscosity of pure substances and mixtures and to estimate the effect of temperature and pressure on viscosity. The student is able to recognise the interactions between a solid body and flowing fluid and to distinguish the forces, their directions and to calculate their magnitudes. The student is able to formulate momentum balance equations and to solve these in order to calculate velocity distribution, flow rate and pressure drop. The student is able to distinguish laminar and turbulent flow regimes from others and is able to use the correct

equations according to flow regime. After the course the student is able to design pipelines and other simple flow mechanical process equipment.

Contents:

Viscosity. Mechanism of momentum transfer. Creating and solving differential momentum balances. Friction factor. Macroscopic balances. Flow in pipes and open-channels.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Munson, B.R., Young, D.F. & Okiishi, T.H. Fundamentals of Fluid Mechanics.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Eero Tuomaala

Working life cooperation:

No

Other information:

-

A440141: Module Preparing for the Major, Mechanical Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Alternative

H440124: Module Preparing for the Major, Machinery Design, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

464101A: Machine drawing and CAD, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapio Korpela
Opintokohteen kielet: Finnish
Leikkaavuudet:

464051A Machine Drawing 3.5 op
464051A-01 Machine Drawing, examination 0.0 op
464051A-02 Machine Drawing, excercise 0.0 op
464052A CAD 3.5 op

Ei opintojaksokuvauksia.

461102A: Statics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Lahtinen, Hannu Tapio
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay461102A Statics (OPEN UNI) 5.0 op
461016A-01 Statics, examination 0.0 op
461016A-02 Statics, exercises 0.0 op
461016A Statics 5.0 op

Ei opintojaksokuvauksia.

465101A: Introduction to materials for mechanical engineering, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Nousiainen, Olli Pekka
Opintokohteen kielet: Finnish
Leikkaavuudet:

465061A-01 Materials Engineering I, examination 0.0 op

465061A-02 Materials Engineering I, design exercise 0.0 op
465061A-03 Materials Engineering I, laboratory exercise 1 0.0 op
465061A-04 Materials Engineering I, laboratory exercise 2 0.0 op
465061A-05 Materials engineering I, laboratory exercise 3 0.0 op
465061A Materials Engineering I 5.0 op

Ei opintojaksokuvauksia.

461103A: Strength of materials I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Lahtinen, Hannu Tapio
Opintokohteen kielet: Finnish
Leikkaavuudet:

461010A-01 Strength of Materials I, examination 0.0 op
461010A-02 Strength of Materials I, exercises 0.0 op
461010A Strength of Materials I 7.0 op

Ei opintojaksokuvauksia.

464102A: Design of machine elements, 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapio Korpela
Opintokohteen kielet: Finnish
Leikkaavuudet:

464055A Machine Design I 8.0 op
464055A-01 Machine Design I, examination 0.0 op
464055A-02 Design exercise 0.0 op
464055A-03 Design exercise I, home exercises 0.0 op
462033A Machine Design 7.0 op

Ei opintojaksokuvauksia.

463101A: Introduction to manufacturing technology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Jouko Heikkala
Opintokohteen kielet: Finnish
Leikkaavuudet:

463052A-01 Introduction to Manufacturing Technology, examnation 0.0 op
463052A-02 Introduction to Manufacturing Technology, excercises 0.0 op
463052A Introduction to Manufacturing Technology 5.0 op

Ei opintojaksokuvauksia.

461106A: Dynamics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Koivurova Hannu
Opintokohteen kielet: Finnish
Leikkaavuudet:

461018A-01 Dynamics, examination 0.0 op
461018A-02 Dynamics, exercises 0.0 op
461018A Dynamics 4.0 op

Ei opintojaksokuvauksia.

H440133: Module Preparing for the Major, Materials Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

462103A: Introduction to Maintenance, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

464087A-01 Maintenancy Technology, examination 0.0 op
464087A-02 Maintenancy Technology, exercise work 0.0 op
464087A Maintenancy Technology 5.0 op

Ei opintojaksokuvauksia.

465103A: Principles of metal shaping and forming, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari Larkiola
Opintokohteen kielet: Finnish
Leikkaavuudet:

465095A-01	Sheet Metal Forming	0.0 op
465095A-02	Sheet Metal Forming, literature review	0.0 op
465095A	Sheet Metal Forming	3.5 op

Ei opintojaksokuvauksia.

465101A: Introduction to materials for mechanical engineering, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Nousiainen, Olli Pekka
Opintokohteen kielet: Finnish
Leikkaavuudet:

465061A-01	Materials Engineering I, examination	0.0 op
465061A-02	Materials Engineering I, design exercise	0.0 op
465061A-03	Materials Engineering I, laboratory exercise 1	0.0 op
465061A-04	Materials Engineering I, laboratory exercise 2	0.0 op
465061A-05	Materials engineering I, laboratory exercise 3	0.0 op
465061A	Materials Engineering I	5.0 op

Ei opintojaksokuvauksia.

463101A: Introduction to manufacturing technology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Jouko Heikkala
Opintokohteen kielet: Finnish
Leikkaavuudet:

463052A-01	Introduction to Manufacturing Technology, examnation	0.0 op
463052A-02	Introduction to Manufacturing Technology, excercises	0.0 op
463052A	Introduction to Manufacturing Technology	5.0 op

Ei opintojaksokuvauksia.

465102A: Materials for mechanical engineering, 5 op

Voimassaolo: 01.08.2016 -
Opiskelumuoto: Intermediate Studies

Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

465104A: Heat treatment and welding of metals, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Leinonen, Jouko Iivari
Opintokohteen kielet: Finnish
Leikkaavuudet:

465077A-01	Welding Technology, examination	0.0 op
465077A-02	Welding Technology, exercises	0.0 op
465077A	Welding Technology	3.5 op

Ei opintojaksokuvauksia.

463103A: Quality in production and dimensional measurements, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Pirkola, Heikki Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:

463062S-01	Quality in prod, exam	0.0 op
463062S-02	Quality in Prod, exam	0.0 op
463062S	Quality in Production	3.5 op

Ei opintojaksokuvauksia.

463102A: Manufacturing technology I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

463053A-01	Manufacturing Technology I, examination	0.0 op
463053A-02	Manufacturing Technology I, exe	0.0 op
463053A	Manufacturing Technology I	3.5 op
463053A2	Manufacturing Technology I	5.0 op

Ei opintojaksokuvauksia.

H440134: Module Preparing for the Major, Manufacturing Technology, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

464101A: Machine drawing and CAD, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapio Korpela
Opintokohteen kielet: Finnish
Leikkaavuudet:

464051A Machine Drawing 3.5 op
464051A-01 Machine Drawing, examination 0.0 op
464051A-02 Machine Drawing, excercise 0.0 op
464052A CAD 3.5 op

Ei opintojaksokuvauksia.

462103A: Introduction to Maintenance, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

464087A-01 Maintenancy Technology, examination 0.0 op
464087A-02 Maintenancy Technology, exercise work 0.0 op
464087A Maintenancy Technology 5.0 op

Ei opintojaksokuvauksia.

465101A: Introduction to materials for mechanical engineering, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Nousiainen, Olli Pekka
Opintokohteen kielet: Finnish
Leikkaavuudet:

465061A-01 Materials Engineering I, examination 0.0 op
465061A-02 Materials Engineering I, design exercise 0.0 op
465061A-03 Materials Engineering I, laboratory exercise 1 0.0 op
465061A-04 Materials Engineering I, laboratory exercise 2 0.0 op
465061A-05 Materials engineering I, laboratory exercise 3 0.0 op
465061A Materials Engineering I 5.0 op

Ei opintojaksokuvauksia.

463101A: Introduction to manufacturing technology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Jouko Heikkala
Opintokohteen kielet: Finnish
Leikkaavuudet:

463052A-01 Introduction to Manufacturing Technology, examnation 0.0 op
463052A-02 Introduction to Manufacturing Technology, excercises 0.0 op
463052A Introduction to Manufacturing Technology 5.0 op

Ei opintojaksokuvauksia.

463104A: Advanced manufacturing methods, 7 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Jyri Porter
Opintokohteen kielet: Finnish
Leikkaavuudet:

463068S-01 Laser Processing, examination 0.0 op
463068S-02 Laser Processing, exercises and seminari 0.0 op
463068S Laser Processing 3.5 op

Ei opintojaksokuvauksia.

463103A: Quality in production and dimensional measurements, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail
Opettajat: Pirkola, Heikki Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:

463062S-01 Quality in prod, exam 0.0 op
463062S-02 Quality in Prod, exam 0.0 op
463062S Quality in Production 3.5 op

Ei opintojaksokuvauksia.

462102A: Machine automation actuators, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Louhisalmi, Yrjö Aulis
Opintokohteen kielet: Finnish
Leikkaavuudet:

462021A-01 Machine Automation I, examination 0.0 op
462021A-02 Machine Automation I, exercise work 0.0 op
462021A Machine Automation I 5.0 op
464064A Actuators 5.0 op

Ei opintojaksokuvauksia.

463102A: Manufacturing technology I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

463053A-01 Manufacturing Technology I, examination 0.0 op
463053A-02 Manufacturing Technology I, exe 0.0 op
463053A Manufacturing Technology I 3.5 op
463053A2 Manufacturing Technology I 5.0 op

Ei opintojaksokuvauksia.

A440147: Module Preparing for the Major, Software Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440130: Module Preparing for the Major, Software Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

521145A: Human-Computer Interaction, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

ECTS Credits:

5

Language of instruction:

In English.

Timing:

Autumn, periods 2

Learning outcomes:

Upon completing the course the student is able to explain the Human Computer Interaction (HCI) fundamentals, explain evaluation and prototyping techniques, explain how HCI can be incorporated in the software development process.

Contents:

Human and computer fundamentals, design and prototyping, evaluation techniques, data collection and analysis.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

Lectures (20 h), exercises (20 h), and practical work (95 h). The course is passed with an approved practical work. The implementation is fully English.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

None. No prior courses are required.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

All necessary material will be provided by the instructor.

Assessment methods and criteria:

The assessment is project-based. Students have to complete three group-based activities throughout the semester: design & prototyping (40%), conduct an evaluation (40%), and complete a report of the activities (20%). Passing criteria: all 3 elements (designs, evaluation, report) must be completed, each receiving more than 50% of the available points.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Vassilis Kostakos

Working life cooperation:

-

811312A: Data Structures and Algorithms, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Ari Vesanen
Opintokohteen kielet: Finnish
Leikkaavuudet:

521144A	Algorithms and Data Structures	6.0 op

ECTS Credits:

5 ECTS credits/134 hours of work

Language of instruction:

Finnish

Timing:

2nd year, autumn semester, period 2

Learning outcomes:

After completing the course, the student can describe the concept of algorithm and explain what correctness and time complexity of algorithms mean. Furthermore, the student is able to explain the design paradigms presented in the course and to describe the complexity classes of relevant sorting algorithms. The student can analyse simple algorithms, i.e. to prove their correctness and evaluate their time complexity. Moreover, the student is able to describe the basic data structures and apply essential graph algorithms. Finally, the student can construct suitable data structures and algorithms for given problems; the student can also justify the choice of a data structure or an algorithm for an application.

Contents:

The concept and analysis of algorithms, sorting and searching algorithms and their complexity, algorithm design paradigms, the concept of data structure and basic data struc-tures, hash tables, binary search trees, graphs and their algorithms.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 40h, exercises 24h, independent work 70h.

Target group:

Prerequisites and co-requisites:

Mastery of subject matter of the course “Discrete Structures” is required.

Recommended optional programme components:

Recommended or required reading:

Cormen, Leiserson, Rivest, Stein: Introduction to algorithms, 2nd edition, MIT Press 2001 (or later). From this edition chapters 1–4, 6–13, 15–16, 22–24, Appendix A and B are covered.

Assessment methods and criteria:

Exam+assignment

Grading:

1-5

Person responsible:

Ari Vesanen

Working life cooperation:

No

521150A: Introduction to Internet, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Ojala, Timo Kullervo

Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

All materials are in English, lectures are given in Finnish.

Timing:

Spring, period 4.

Learning outcomes:

Upon completing the course the student is able to explain the structure of the public Internet and the TCP/IP protocol stack, solve simple Internet problems, and design and implement a small Internet application.

Contents:

Internet’s design principles and architecture, most important access networks, TCP/IP protocol stack and most important network layer and transport layer protocols, most important Internet applications, basics of Internet security and multimedia.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 32 h / problem solving exercises 12 h / laboratory exercises 12 h / course work 25 h / self-study 52 h. Problem solving exercises, laboratory exercises and course work are completed as group work.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

-

Recommended or required reading:

Will be announced at the beginning of the course.

Assessment methods and criteria:

The course uses continuous assessment so that there are 3 intermediate exams. Alternatively, the course can also be passed with a final exam. The course includes a mandatory course work.

Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course uses numerical grading scale 1-5.

Person responsible:

Professor Timo Ojala.

Working life cooperation:

-

811167P: Introduction to Information Systems Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Rajanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811167P	Introduction to Information Systems Design (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS credits/136 hours of work

Language of instruction:

finnish

Timing:

1 st year of Bachelor studies, period 3

Learning outcomes:

After completing the course, the student will be able to:

- Explain the main areas of the information system design on technical level, main design process models for the information system design, basics of the requirement gathering, basics of the information system initialization, and basics of how to evaluate information systems.;
- Produce use-case descriptions, use-case diagrams and other types of diagrams and descriptions needed to model the operational environment of the information system

Contents:

Basic concepts of Information Systems, Information System Design, Information System Modeling, Operational Environment Modeling, Process models for Information System Development, Evaluation of Information Systems

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures (9x3h), Exercises (7x3h), Assignment (85h), Exam (3h).

Recommended or required reading:

Structure and contents of the course are based on:

- Satzinger, Jackson ja Burd (2007), Systems Analysis and Design in a Changing World
- Hoffer, George and Valacich (2008), Modern systems Analysis and Design, 5. revision

Assessment methods and criteria:

Exam and mandatory assignment

Grading:

1-5

Person responsible:

Mikko Rajanen

Compulsory

811167P-01: Introduction to Information Systems Design, exercise work, 0 op

Opiskelumuoto: Basic Studies
Laji: Partial credit
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

811167P-02: Introduction to Information Systems Design, exam, 0 op

Opiskelumuoto: Basic Studies
Laji: Partial credit
Arvostelu: 1 - 5, pass, fail
Opettajat: Mikko Rajanen
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

521286A: Computer Systems, 8 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Leppänen
Opintokohteen kielet: Finnish
Leikkaavuudet:

521142A Embedded Systems Programming 5.0 op

ECTS Credits:

8

Language of instruction:

Lecturing in Finnish, course and exercise material available in English.

Timing:

Autumn, periods 1-2. Will be held next time in the autumn of 2016.

Learning outcomes:

Upon completing the course, the student understands the basic computer architecture and organization. Student understands CPU operation and datapath in general. Student knows number systems and data representations in computers. Student is familiar of I/O operation with peripheral devices in general. Student is able to implement small programs with the C programming language for general-purpose computers for embedded systems. Student recognizes how embedded systems programming is different from programming general-purpose computers.

Contents:

Computer architecture and organization, CPU, memory organization and management, data types, registers and I/O, general computer and embedded systems programming, basics of the C programming language.

Mode of delivery:

Web-based and face-to-face teaching.

Learning activities and teaching methods:

Lectures (40h), course exercises (20h), laboratory exercise (3h) and course projects in groups.

Target group:

2nd year students of computer science and engineering and 3rd year students of electrical engineering.

Prerequisites and co-requisites:

Elementary programming 521141P.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Lecture notes. Mano M., Computer System Architecture. Prentice Hall, 1993. Patterson D., Hennessy J., Computer Organization and Design. Morgan Kauffman, 2005. Williams, E.: Make: AVR Programming, Learning to Write Software for Hardware, O'Reilly, 2014.

Assessment methods and criteria:

Students complete the course exercises after lectures, participate to the laboratory exercise and complete the course projects in groups. Assessment is based on the exercises and the course projects. More detailed information on assessment can be found from the course Web page, https://noppa.oulu.fi/noppa/kurssi/521286a/.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Teemu Leppänen, Mika Rautiainen.

Working life cooperation:

No.

521457A: Software Engineering, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Röning

Opintokohteen kielet: English

Leikkaavuudet:

ay521457A Software Engineering (OPEN UNI) 5.0 op

ECTS Credits:

5

Language of instruction:

Finnish. Material available in English.

Timing:

Spring, periods 3.

Learning outcomes:

After finishing the course, the student knows the basic concepts of software and real-time systems, the different areas of project management, the phases of software development and the goals and tasks of them, is able to use structural methods for defining systems and knows the principles of object-oriented design and analysis. After the course, the student has basic knowledge of utilizing software tools for structural analysis and design.

Contents:

Problematics of software development and the special features of real-time systems in this regard. Software development is viewed in regard to project management and actual implementation: 1. process models, 2. requirements specification, 3. project management basics: design, metrics, risk management, resource management, follow up, quality control, product control, 5. structural analysis and design, 5. software testing methods and strategies, 6. introduction to object-oriented analysis and design.

Mode of delivery:

Face-to-face.

Learning activities and teaching methods:

The course consists of lectures and a laboratory design exercise. The course is completed by a final exam and a successfully completed exercise. Lectures 30 h, laboratory design (in period 3) 12 h, the rest of the self-study.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

521141P Elementary Programming, 521286A Computer Systems or 521142A Embedded Systems Programming.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

R.S. Pressman: Software Engineering - A Practitioner's Approach. Sixth Edition. McGraw-Hill 2005, chapters 1-11, 13-14 and 21-27. Older editions (4th and 5th) can also be used as a reference. In this case the lectures are based on chapters 1-20.

Assessment methods and criteria:

Final exam and accepted laboratory exercise.

Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Juha Röning

Working life cooperation:

-

811379A: Basics of Human Computer Interaction, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Liisa Syrjänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811379A Basics of Human Computer Interaction (OPEN UNI) 5.0 op

812327A Introduction to HCI design 4.0 op

ECTS Credits:

5 ECTS credits/133 hours of work

Language of instruction:

Finnish

Timing:

2 nd year, spring semester, period 3

Learning outcomes:

After completing the course, a student is able to define the basic concepts of user interface design, introduce the basic design process and its steps, the most common design and evaluation methods and tasks, and apply them in the context of graphical user interface design from the viewpoint of a certain user group and system.

Contents:

The fundamental concepts of user interface design and usability evaluation; user-centred design process; evaluation of the user group's viewpoint and application to graphical interface design, structure and elements by prototyping and user-based evaluation; user interface description, universal design and user support.

Mode of delivery:

Face-to-face teaching, self-study

Learning activities and teaching methods:

Learning Activities and Teaching Methods: Lectures (21 h), assignments in exercises (24 h), individual and group tasks (88 h); or self-study: an opening lecture (2 h), one larger assignment (110 h) and individual tasks (21 h).

Target group:

Prerequisites and co-requisites:

Course "Humans as Users and Developers of Information Technology" (811171P) or similar knowledge.

Recommended optional programme components:

Recommended or required reading:

Dix et al. (2004, 3rd edition or later edition) Human-Computer Interaction and lecture and assignment materials.

Assessment methods and criteria:

Accepted assigments and individual tasks.

Grading:

1–5

Person responsible:

Anna-Liisa Syrjänen

Working life cooperation:

No

811395A: Basics of Databases, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Iisakka, Juha Veikko
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits/ 133 hours of studying

Language of instruction:

finnish

Learning outcomes:

After completing the course, students understand what databases are and what their meaning for information systems is. They can model conceptually for database designing purposes, design a high-quality relational database and make queries to it. They understand transactions, schedules of transactions, serialiseability of schedules and recovery choices of schedules. They also know what different SQL Isolation levels means to safety of transactions.

Contents:

Conceptual modelling (ER- and EER-diagrams), relational model (theory, databases, query techniques and normalization), transactions.

Mode of delivery:

face to face

Learning activities and teaching methods:

Lectures 45h, compulsory exercises 24h and (reading 20h) and exams 21h. Self-studying 23 h.

Prerequisites and co-requisites:

The student knows basics of programming.

Recommended or required reading:

Silberschatz, Korth & Sudarshan: Database system concepts. Elmasri & Navathe: Fundamentald of database systems.

Assessment methods and criteria:

The course is divided to five parts. All parts must be passed in a year. Students must show they achieve at least half of required knowledge of each part.

Grading:

1-5

Person responsible:

Jua Iisakka

A440143: Module Preparing for the Major, Process Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440126: Module Preparing for the Major, Process Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

477011P: Introduction to Process and Environmental Engineering I, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Aki Sorsa, Sanna Taskila
Opintokohteen kielet: Finnish
Leikkaavuudet:

470219A	Introduction to Process Engineering	3.5 op

ECTS Credits:

5 ECTS /133 hours of work

Language of instruction:

Finnish

Timing:

Implementation during periods 1-2 on the autumn term

Learning outcomes:

The objective of this course is to give insight to the whole perspective of process and environmental engineering and to familiarise the students with the terminology involved. In addition, the objective is also to outline the connections between process and environmental engineering and other fields closely related to them.
After the course, the student can analyse the process and environmental engineering aspects of an industrial process. He/She can, for example, divide the process into unit processes, analyse the process or a chain of processes based on the material balances, identify and evaluate the significance of essential mechanical, chemical and transport phenomena, analyse the control and process design aspects of a process etc. He/She can also evaluate the significance of different aspects of process and environmental engineering to the overall production system when these aspects are further examined in forthcoming courses.

Contents:

The course is divided into the next eight separate themes: 1. Unit processes and material balances. 2. Environmental impacts and their classification. 3. Mechanical phenomena. 4. Momentum, heat and mass transfer phenomena. 5. Chemical reactions and reactors. 6. The possibilities of biological process engineering. 7. Process dynamics and control. 8. Process measurements and measurability.

Mode of delivery:

Group work and contact lectures supporting those

Learning activities and teaching methods:

Assignments (8 altogether) carried out in small groups and contact lectures supporting them (16 hours)

Target group:

Bachelor's degree students in the study fields of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

The course serves as an introduction to the studies in process and environmental engineering

Recommended or required reading:

The material is provided during the contact lectures and through the course webpages. It is also expected that the students seek material for completing the assignments independently.

Assessment methods and criteria:

The assignments (altogether 8) covering the course themes carried out in small groups.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilises a numerical grading scale 1-5 and fail.

Person responsible:

Dr Aki Sorsa

Working life cooperation:

No

Other information:

The assessment method utilized requires the active attendance to the group work and contact lectures from the beginning of the course

477201A: Material and Energy Balances, 5 op

Voimassaolo: 01.08.2005 - 31.12.2019
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tiina Leiviskä
Opintokohteen kielet: Finnish
Leikkaavuudet:

477221A	Material and Energy Balances	5.0 op
470220A	Fundamentals of Chemical Process Engineering	5.0 op

ECTS Credits:

5 ECTS /133 hours of work

Language of instruction:

Finnish. The course can be completed in English as a book examination.

Timing:

Autumn period 1

Learning outcomes:

The student is able to formulate material and energy balances for a process by taking into account the restrictions set by reaction stoichiometry. The student knows how the created mathematical formulation can be exploited in process consideration.

Contents:

Formulation of material and energy balances by taking into account the effects of chemical reactions.

Mode of delivery:

Lectures and group exercise

Learning activities and teaching methods:

Lectures 40h, group work 10h and self-study 80h

Target group:

Bachelor students in of Process or Environmental Engineering

Prerequisites and co-requisites:

Basics from the course Introduction to Process Engineering

Recommended optional programme components:

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Recommended or required reading:

Reklaitis, G.V.: Introduction to Material and Energy Balances. John Wiley & Sons, 1983. ISBN 0-471-04131-9.

Assessment methods and criteria:

During the course, there are two intermediate exams and both of them must be passed. Alternatively student can participate in final exam after the course. In addition to this, the students will be making a group exercise, which will be evaluated.
Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Dr Tiina Leiviskä

Working life cooperation:

No

Other information:

-

477401A: Thermodynamic Equilibria, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Eetu-Pekka Heikkinen
Opintokohteen kielet: Finnish
Leikkaavuudet:

470611A	Metallurgy Processes	7.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the autumn semester, during period II. It is recommended to complete the course at the 2nd year of Bachelor's studies.

Learning outcomes:

Student is capable of defining chemical equilibria of the systems that are related to industrial processes and understands the relevance of equilibria (and their computational determination) as a part of process analysis, planning and control. Additionally, (s)he can define a meaningful system to be considered in computation thermodynamics; i.e. (s)he can create a computationally solvable problem based on technical problem that in itself is not solvable computationally.

Contents:

Concepts of entalphy (H), entropy (S) and Gibbs free energy (G). The effect of temperature and pressure on H, S and G. Chemical and phase equilibria. Activity and activity coefficient. Calculation of thermodynamic equilibria using equilibrium constant as well as Gibbs free energy minimisation.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Lectures, software exercise as well as other exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

'Basic Principles in Chemistry' and 'Material and Energy Balances' as prerequisities

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a education that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Material will be distributed during lectures and exercises.

Assessment methods and criteria:

Students are required to make a portfolio consisting of a learning diary and exercices. Please note that the course is organised only in Finnish.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University Lecturer Eetu-Pekka Heikkinen

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun. Course webpage (in Finnish): http://www.oulu.fi/pyomet/477401a.

488010P: Introduction to Process and Environmental Engineering II, 5 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Fabritius, Timo Matti Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

488011P	Introduction to Environmental Engineering	5.0 op
477012P	Introduction to Automation Engineering	5.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the spring semester, during periods III and IV. It is recommended to complete the course at the 1st spring semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. material management, phenomenon-based considerations and automation) and they recognize the role of different areas of the process and environmental engineering, when these areas are considered in the forthcoming courses.

Contents:

1. Environmental thinking and industrial ecology. 2. Materials in production processes. 3. Water resources and land use. 4. Municipal and industrial water supply. 5. PI diagrams. 6. Process design. 7. Control and operation of processes.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Group exercises and contact-education (14 h) that supports these exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

This course is an introduction to the other courses of process and environmental engineering

Recommended or required reading:

Material will be distributed during lectures and via course www-site

Assessment methods and criteria:

Group exercises. Please note that the course is not available in English, but only in Finnish. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Timo Fabritius

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun.

477051A: Automation Engineering, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477601A Process Automation Systems 4.0 op

ECTS Credits:

5 ECTS /133 h of work

Language of instruction:

Finnish

Timing:

Autumn, period 1

Learning outcomes:

Students learn how to use PI diagrams, field instruments, automation systems and PLCs in design, implementation and commissioning projects. Students can configure and program the basic automation functions in DCSs and PLCs

Contents:

The operational and structural descriptions and concepts of process automation, automation commissioning projects, PI diagrams and field devices, configuration tools for automation functions, logic programming, telecommunication technology in automation, field buses, examples of commercial DCSs, PLCs and field bus systems

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures, demonstrations, configuration and logic programming exercises, excursion to a neighbouring industrial plant

Target group:

B.Sc. students in process and environmental engineering

Prerequisites and co-requisites:

477011P Introduction to process and environmental engineering I and 448010P Introduction to process and environmental engineering II are recommended

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes and handouts, manuals/handbooks

Assessment methods and criteria:

Learning diary or examination

Grading:

Numerical grading scale 1-5 or fail

Person responsible:

Jukka Hiltunen and Aki Sorsa

Working life cooperation:

No

Other information:

-

477322A: Heat and Mass Transfer, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477323A	Mass and Heat Transfer	5.0 op
477302A	Heat Transfer	3.0 op
477303A	Mass Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Implementation in autumn semester during 1 st period. It is recommended to complete the course at the third (Bachelor's) autumn semester. The course will be lectured first time in autumn 2016.

Learning outcomes:

After passing the course the student knows what happens when heat is transferred by conduction, convection and radiation. The student can describe energy transfer with differential energy balances connected with momentum balances; In macro scale the student is able to solve practical heat transfer problems by correlating heat transfer coefficients to dimensionless flow and material characteristics; With the help of these transfer coefficients the student is capable of estimating the size of heat transfer equipment, especially heat exchangers and select the most suitable and profitable types; and to Sketch large heat nets and to diminish the costs of the equipments.
The student is able to use the pinch method which optimises the number of heat exchangers and total energy consumption. He/she is also able to apply the exergy principle to make work from thermal energy. With the aid of this principle he/she will be able to divide the costs of the used energy in right proportion based on the processing stage. He/she student is able to explain diffusion as a phenomenon and the factors affecting it. He/she is able to model mass transfer in simple systems by using the theory of Fick. The student is capable of modeling diffusion by differential mass balances. He/she recognises the special features of mass transfer in turbulent systems and the role of different transport phenomena in mass transfer equipment. He/she has rudimentary practical skills applicable to the scale-up of the equipment used for absorption.

Contents:

Mechanism of heat transfer. Creating and solving differential energy balances. Heat transfer coefficient. Macroscopic balances. Selection of a proper type of heat exchanger.Scale-up and design of a heat exchanger.Design of heat exchanger networks using pinch technology.Exergy analysis for the heat flows. Diffusion. The Fick law of diffusion. Mass transfer in simple systems. Differential mass balances. Models of mass transfer in turbulent systems. Interphase mass transfer. Absorption.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

(Will be announced later)

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Kaisu Ainassaari

Working life cooperation:

No

Other information:

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477304A: Separation Processes, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Muurinen, Esa Ilmari, Ainassaari, Kaisu Maritta

Opintokohteen kielet: Finnish

Leikkaavuudet:

470323A	Separation Processes	5.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in autumn semester during 2 nd periods. It is recommended to complete the course on the third (Bachelor's) autumn semester.

Learning outcomes:

After the course the student is able to define the position of separation processes based on mass transfer in process and environmental engineering. He/she is capable of solving phase equilibrium problems in multistage separations for binary mixtures. The student is able to explain the phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation, membrane separations, and reactive separations. He/she recognises the equipment used for these processes and is able to compare the methods to each other with heuristic rules.

Contents:

Separation processes based on mass transfer in process and environmental engineering. Phase equilibrium problems in multistage separations for binary mixtures. Phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation, membrane separations, and reactive separations. Equipment used for these processes and is able to compare the methods to each other with heuristic rules, etc.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 40 h, exercises 20 h, homework 15 h and self-study 58 h. For foreign students written examination based on given literature and homework.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Courses 477301A Momentum Transfer, 477302A Heat Transfer and 477303A Mass Transfer or 477052A Fluid Mechanics and 477312A Heat and Mass Transfer are recommended beforehand.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Seader, J.D., Henley, E.J. & Roper, D.K.: Separation Processes Principles. Wiley 2011, 821 p.; Noble, R.D. & Terry, P.A.: Principles of Chemical Separations with Environmental Applications. Cambridge 2004, Cambridge University Press.321 p.

Assessment methods and criteria:

Homework assignments affect the course grade. Examination. The course can be completed with two intermediate exams or one final exam. Homework assignments affect the course grade. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi /english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Laboratory manager Dr Esa Muurinen

Working life cooperation:

No

Other information:

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477052A: Fluid Mechanics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477301A	Momentum Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in spring semester during 3 rd period. It is recommended to complete the course at the second (Bachelolor's) spring semester. The course will be lectured first time in spring 2016.

Learning outcomes:

After the course the student is able to determine the viscosity of pure substances and mixtures and to estimate the effect of temperature and pressure on viscosity. The student is able to recognise the interactions between a solid body and flowing fluid and to distinguish the forces, their directions and to calculate their magnitudes. The student is able to formulate momentum balance equations and to solve these in order to calculate velocity distribution, flow rate and pressure drop. The student is able to distinguish laminar and turbulent flow regimes from others and is able to use the correct equations according to flow regime. After the course the student is able to design pipelines and other simple flow mechanical process equipment.

Contents:

Viscosity. Mechanism of momentum transfer. Creating and solving differential momentum balances. Friction factor. Macroscopic balances. Flow in pipes and open-channels.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Munson, B.R., Young, D.F. & Okiishi, T.H. Fundamentals of Fluid Mechanics.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Eero Tuomaala

Working life cooperation:

No

Other information:

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A440142: Module Preparing for the Major, Civil Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440125: Module Preparing for the Major, Civil Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

464101A: Machine drawing and CAD, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapio Korpela
Opintokohteen kielet: Finnish
Leikkaavuudet:

464051A Machine Drawing 3.5 op
464051A-01 Machine Drawing, examination 0.0 op
464051A-02 Machine Drawing, excercise 0.0 op
464052A CAD 3.5 op

Ei opintojaksokuvauksia.

461102A: Statics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Lahtinen, Hannu Tapio
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay461102A Statics (OPEN UNI) 5.0 op
461016A-01 Statics, examination 0.0 op
461016A-02 Statics, exercises 0.0 op
461016A Statics 5.0 op

Ei opintojaksokuvauksia.

461103A: Strength of materials I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Lahtinen, Hannu Tapio
Opintokohteen kielet: Finnish
Leikkaavuudet:

461010A-01 Strength of Materials I, examination 0.0 op
461010A-02 Strength of Materials I, exercises 0.0 op
461010A Strength of Materials I 7.0 op

Ei opintojaksokuvauksia.

466101A: Introduction to building construction, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Liedes, Hannu Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

485101A Introduction to building construction 5.0 op
460116A-01 Introduction to Contruction Engineering, examination 0.0 op
460116A-02 Introduction to Contruction Engineering, exercise work 0.0 op
460116A Introduction to Building Construction 3.0 op

Ei opintojaksokuvauksia.

466102A: Introduction to structural design, 3 - 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Liedes, Hannu Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

485102A Introduction to structural design 5.0 op
460117A-01 Introduction to Structural Design, examination 0.0 op
460117A-02 Introduction to Structural Design, exercise work 0.0 op
460117A Introduction to Structural Design 6.0 op

Ei opintojaksokuvauksia.

466113S: Construction economics, 5 op

Voimassaolo: 01.08.2015 - 31.07.2018
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

485021A Construction Contracting 5.0 op
460165A-01 Introduction to Construction Economics I, examination 0.0 op
460165A-02 Introduction to Construction Economics I, practical work 0.0 op
460165A Introduction to Construction Economics I 3.0 op

Ei opintojaksokuvauksia.

466111S: Building physics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Hannila, Raimo Sakari
Opintokohteen kielet: English
Leikkaavuudet:

485103A Building physics 5.0 op
460160S-01 Building Physics, examination 0.0 op
460160S-02 Building Physics, exercises 0.0 op
460160S Building Physics 3.5 op

Ei opintojaksokuvauksia.

466104S: Foundation engineering, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

460163S Foundation Engineering 5.0 op
460163S-01 Foundation Engineering, examination 0.0 op
460163S-02 Foundation Engineering, exercises 0.0 op

Ei opintojaksokuvauksia.

A440149: Module Preparing for the Major, Electrical Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440132: Module Preparing for the Major, Electrical Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

521109A: Electrical Measurement Principles, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Saarela
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Course is lectured in Finnish. Laboratory exercises and the exam can be done in English.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course, students are able to measure basic measurements with a ammeter, voltmeter and oscilloscope. They can operate signal and function generators. They can estimate the validity of their measurements.

Contents:

Units of measures, standards of measures, analysis of errors, most commonly used analog and digital measuring methods, equipment and electrical safety regulations.

Mode of delivery:

Pure face-to-face teaching.

Learning activities and teaching methods:

Lectures 20h, laboratory exercises 16 h and self-study 100h.

Target group:

Course is compulsory for electrical engineering, information engineering and wellness technology students.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

None.

Recommended or required reading:

Kurssimateriaali Optimasta.

Assessment methods and criteria:

Exam and passed lab exercises.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grade is based on exam and grade is on numerical scale 1-5.

Person responsible:

Juha Saarela

Working life cooperation:

None.

Other information:

-

521077P: Introduction to Electronics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Hannu

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay521077P Introduction to Electronics (OPEN UNI) 5.0 op

521209A Electronics Components and Materials 2.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

2nd period.

Learning outcomes:

Objective: The course provides basic concepts of electronic systems with emphasis on properties of electronics components and how the materials affect to their operation
Learning outcomes: Student understands the block structures of electronic devices and their signal processing paths. Student can identify the interfaces of analog and digital electronics and the software operations. Student is able to identify and classify electronics components and compare their properties. Students can describe electric conductivity and apply the phenomenon on designing and choosing resistors. Student is able to estimate the difference between dielectric materials and how they affect the properties of a capacitor. Student can compare properties of magnetic materials and how identify they effect on inductive components. Student can identify semiconductivity and is able to list typical semiconductor components. Student can classify different circuit board techniques and is able to choose proper coupling techniques. In addition student can identify the future technologies of electronics materials

Contents:

Structures and interfaces of electronic devices. Electromagnetic properties of materials (conductivity, dielectricity, magnetism and semiconductivity).Electronics components (resistors, capacitors, inductive components and semiconductors). Interconnection technologies and circuit board technologies. The future of electronic materials and application areas.

Mode of delivery:

Classroom teaching and independent work.

Learning activities and teaching methods:

Lectures (24 h) and guided laboratory work (24 h).

Target group:

First year electrical engineering students.

Prerequisites and co-requisites:

No prerequisites.

Recommended optional programme components:

-

Recommended or required reading:

Lecture material; Materials science and engineering: an introduction / Willam D. Callister, chapters 1, 18 and 20; Electronic components and technology / S. J. Sangwine. Chapters 1,2,3,5 and 7

Assessment methods and criteria:

Course work and final exam.

Grading:

Numerical grading 1-5.

Person responsible:

Jari Hannu

Working life cooperation:

-

521301A: Digital Techniques 1, 8 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Antti Mäntyniemi

Opintokohteen kielet: Finnish

Leikkaavuudet:

521412A-02 Digital Techniques 1, Exercise Work 0.0 op

521412A Digital Techniques 1 6.0 op

521412A-01 Digital Techniques, Exam 0.0 op

ECTS Credits:

8

Language of instruction:

Finnish

Timing:

Periods 3-4

Learning outcomes:

After the course, students are able to ably binary number system and Boolean algebra in the form of switching algebra to the design and functional analyze of simple digital circuits. In addition, they are also able to use in their designs graphical symbols specified in the dependency notation standard (SFS4612 ja IEEE/ANSI Std.91-1991) and different descriptions of function and structure of state machines. Based on this knowledge, students are able to implement and analyze digital devices consisting of ordinary simple digital components. After having assimilated the basic knowledge of digital technique, students are able to understand also the function and structure of micro controllers and micro processors.

Contents:

The principles of digital devices, Boolean algebra, numeral systems, operating principle, analysis and synthesis of combinational logic, flip-flops, operating principle, analysis and synthesis of sequential logic (state machines), physical characteristics of CMOS technology, registers and register transfers, computer memory, instruction set architecture, computer design basics, interfaces and data transmission

Mode of delivery:

Classroom

Learning activities and teaching methods:

Lessons 40 h, guidance of the project work 20 h.

Target group:

1st year BSc students

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Text books, MIT OpenCourseWare and execise literature.

Assessment methods and criteria:

Project work, home assignment and exam. Partial exams are recommended.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Project work pass/fail. Numerical grading 1-5 for exam. Final grading is based on exam.

Person responsible:

Antti Mäntyniemi

Working life cooperation:

-

Other information:

-

521302A: Circuit Theory 1, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Rahkonen, Timo Erkki
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Finnish. Exams can be arranged in English on demand.

Timing:

Spring, period 4

Learning outcomes:

After the course the student can

- write and solve the equations describing the operation of a given electrical circuit
- solve the sinusoidal steady-state solution using complex phasor arithmetics
- solve time responses of electric circuits
- simplify electrical circuits e.g. using equivalent circuits
- simulate simple circuits and choose an appropriate circuit simulation method

Contents:

Equation of basic circuit elements, circuit laws and systematic building of network equations. Calculation of time and frequency responses. Use of complex phasor arithmetics. Basics of the use of circuit simulators.

Mode of delivery:

Classroom.

Learning activities and teaching methods:

30h lectures, 22 h exercises, and a simulation exercise.

Target group:

Finnish BSc students.

Prerequisites and co-requisites:

Matrix algebra, complex arithmetics, differential equations.

Recommended optional programme components:

-

Recommended or required reading:

Nilsson, Riedel: Electric Circuits (6th or 7th ed., Prentice-Hall 1996), Chapters 1-11.

Assessment methods and criteria:

Final exam. Also the simulation exercise must be passed.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5

Person responsible:

Prof. Timo Rahkonen

Working life cooperation:

-

Other information:

-

521329A: Hands-on Course in Wireless Communication, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Heikki Antero Kärkkäinen
Opintokohteen kielet: Finnish
Leikkaavuudet:

521316A	Broadband Communications Systems	4.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Autumn, period 1

Learning outcomes:

This course introduces students into problems of wireless communication technology with the aid of small laboratory exercises which do not require prior knowledge on telecommunication engineering. A student observes and learns the operation principles, properties and limitations of existing wireless communication systems with the aid of modern measurement instruments & methods used in laboratory environment. After completing the course a student can approach different kinds of wireless communication problems utilizing engineering practices.

Contents:

Students are introduced to the wireless communication systems and corresponding phenomena with the aid of guided laboratory exercises. The course utilizes various existing wireless communication systems, in order to create simple connections between various equipment and modules in a laboratory environment.

Mode of delivery:

Contact teaching and guided laboratory exercises.

Learning activities and teaching methods:

Students will participate in briefing lectures which introduce the theory needed to conduct the laboratory work items. After each lecture students will study a given problem with the aid of measuring instruments in a laboratory environment. Work items are conducted by groups of two students, and results are given in written report. Course contains 14 h of contact teaching and 28 h of laboratory work. In addition, self-study, discussion and reporting of results are performed.

Target group:

Second year bachelor level electrical engineering students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Lecture slides and problem assignments. Materials are stored into OPTIMA environment.

Assessment methods and criteria:

A group of two students participates in contact teaching and prepares a final report according teacher's instructions. Participation in laboratory exercises is mandatory for both students of a group.

Grading:

The course unit utilizes a numerical grading scale 1-5.
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Kari Kärkkäinen

Working life cooperation:

-

Other information:

-

521303A: Circuit Theory 2, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Rahkonen, Timo Erkki
Opintokohteen kielet: Finnish
Leikkaavuudet:

521306A Circuit Theory 2 4.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Period 2

Learning outcomes:

After the course the student can:

- use Laplace transform for solving time and frequency response of electric circuits;
- derive continuous-time transfer functions.;
- solve their poles and zeros and understand the meaning of those;
- draw the pole-zero map and Bode plots of any given transfer function;
- construct 2-port parameter models of a given circuit

Contents:

Use of Laplace transform in network analysis. Properties of network functions, poles and zeros, Boden magnitude and phase plots. 2-port parameter models.

Mode of delivery:

Classroom

Learning activities and teaching methods:

30h lectures, 22 h exercises, and simulation excerices.

Target group:

Finnish BSc students

Prerequisites and co-requisites:

Basics of circuit theory, differential equations.

Recommended optional programme components:

-

Recommended or required reading:

Nilsson, Riedel: Electric Circuits (6th or 7th ed., Prentice-Hall 1996), Chapters 12-18.

Assessment methods and criteria:

Course is examined by a final exam. Obligatory simulation exercise must be passed.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical 1-5

Person responsible:

Prof. Timo Rahkonen

Working life cooperation:

-

Other information:

-

521104P: Introduction to Material Physics, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Hagberg
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

In Finnish.

Timing:

Periods 3.

Learning outcomes:

Objective: The students are introduced to the physical principles of electronic and atomic phenomena existing in electronic materials and components. The connections to the general principles of solid state physics are emphasized in the consideration of the phenomena.
Learning outcomes: After completing the course, student is able to explain the principal solid state crystal structures. He or she can explain how propagating waves and electrons in a crystal lattice can be presented. Moreover, he or she can explain the free electron model of metals and the formation of the energy band structure in crystals and their significance to the electrical properties of materials. He or she is able to explain the basic phenomena related to semiconductors and is able to calculate the charge carrier concentrations in them.

Contents:

Crystal structures, cohesion and defects. Reciprocal lattice and waves in crystals. Statistical mechanics and thermal vibration. Free electron model of metals. Energy bands in crystal. Basic phenomena of semiconductors.

Mode of delivery:

Lectures, exercises and home works.

Learning activities and teaching methods:

Lectures 28 h / exercises 22 h / self-access learning 60 h.

Target group:

Second year electrical engineering students

Prerequisites and co-requisites:

Basic physics and mathematics.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes (in Finnish). English material for instance parts from books: H.M. Rosenberg: The Solid State, Clarendon Press, Oxford, 1988 and B. Streetman: Solid State Electronic Devices, Prentice Hall, New Jersey, 1995.

Assessment methods and criteria:

Will be notified in the beginning of lectures.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5.

Person responsible:

Juha Hagberg

Working life cooperation:

No

521431A: Principles of Electronics Design, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Häkkinen
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Finnish.

Timing:

Spring, period 4

Learning outcomes:

On completion of the study module students should be able to analyze and design such electronic building blocks as rectifiers, clamping circuits, amplifiers and CMOS logic elements using diodes, operational amplifiers and MOS and bipolar junction transistors.

Contents:

Analogue and digital circuits, basic amplifier related concepts, operational amplifier, diodes and diode circuits, single stage bipolar and MOS transistor amplifiers, small signal modeling and analyzing ac properties of amplifiers, internal structures of digital circuits (mainly CMOS), MOS /CMOS switch.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 30 h and exercises 20 h.

Target group:

-

Prerequisites and co-requisites:

Circuit Theory I

Recommended optional programme components:

Recommended course Principles of Semiconductor Devices

Recommended or required reading:

Lecture notes, Razavi: Fundamentals of Microelectronics (John Wiley & Sons 2008), chapters 1-8 and 15 partially or Sedra & Smith : Microelectronic Circuits (6th ed.), chapters 1-5 and 14.

Assessment methods and criteria:

Final or 2 mid-term exams.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 1-5.

Person responsible:

Juha Häkkinen

Working life cooperation:

-

Other information:

-

A440148: Module Preparing for the Major, Information Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440131: Module Preparing for the Major, Information Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

521109A: Electrical Measurement Principles, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Saarela
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Course is lectured in Finnish. Laboratory exercises and the exam can be done in English.

Timing:

Periods 1-2.

Learning outcomes:

Upon completion of the course, students are able to measure basic measurements with a ammeter, voltmeter and oscilloscope. They can operate signal and function generators. They can estimate the validity of their measurements.

Contents:

Units of measures, standards of measures, analysis of errors, most commonly used analog and digital measuring methods, equipment and electrical safety regulations.

Mode of delivery:

Pure face-to-face teaching.

Learning activities and teaching methods:

Lectures 20h, laboratory exercises 16 h and self-study 100h.

Target group:

Course is compulsory for electrical engineering, information engineering and wellness technology students.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

None.

Recommended or required reading:

Kurssimateriaali Optimasta.

Assessment methods and criteria:

Exam and passed lab exercises.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grade is based on exam and grade is on numerical scale 1-5.

Person responsible:

Juha Saarela

Working life cooperation:

None.

Other information:

-

521145A: Human-Computer Interaction, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

ECTS Credits:

5

Language of instruction:

In English.

Timing:

Autumn, periods 2

Learning outcomes:

Upon completing the course the student is able to explain the Human Computer Interaction (HCI) fundamentals, explain evaluation and prototyping techniques, explain how HCI can be incorporated in the software development process.

Contents:

Human and computer fundamentals, design and prototyping, evaluation techniques, data collection and analysis.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

Lectures (20 h), exercises (20 h), and practical work (95 h). The course is passed with an approved practical work. The implementation is fully English.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

None. No prior courses are required.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

All necessary material will be provided by the instructor.

Assessment methods and criteria:

The assessment is project-based. Students have to complete three group-based activities throughout the semester: design & prototyping (40%), conduct an evaluation (40%), and complete a report of the activities (20%). Passing criteria: all 3 elements (designs, evaluation, report) must be completed, each receiving more than 50% of the available points.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Vassilis Kostakos

Working life cooperation:

-

521150A: Introduction to Internet, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Ojala, Timo Kullervo
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

All materials are in English, lectures are given in Finnish.

Timing:

Spring, period 4.

Learning outcomes:

Upon completing the course the student is able to explain the structure of the public Internet and the TCP/IP protocol stack, solve simple Internet problems, and design and implement a small Internet application.

Contents:

Internet's design principles and architecture, most important access networks, TCP/IP protocol stack and most important network layer and transport layer protocols, most important Internet applications, basics of Internet security and multimedia.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 32 h / problem solving exercises 12 h / laboratory exercises 12 h / course work 25 h / self-study 52 h. Problem solving exercises, laboratory exercises and course work are completed as group work.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

-

Recommended or required reading:

Will be announced at the beginning of the course.

Assessment methods and criteria:

The course uses continuous assessment so that there are 3 intermediate exams. Alternatively, the course can also be passed with a final exam. The course includes a mandatory course work.

Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course uses numerical grading scale 1-5.

Person responsible:

Professor Timo Ojala.

Working life cooperation:

-

521301A: Digital Techniques 1, 8 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
Opettajat: Antti Mäntyniemi
Opintokohteen kielet: Finnish
Leikkaavuudet:

521412A-02 Digital Techniques 1, Exercise Work 0.0 op
521412A Digital Techniques 1 6.0 op
521412A-01 Digital Techniques, Exam 0.0 op

ECTS Credits:

8

Language of instruction:

Finnish

Timing:

Periods 3-4

Learning outcomes:

After the course, students are able to ably binary number system and Boolean algebra in the form of switching algebra to the design and functional analyze of simple digital circuits. In addition, they are also able to use in their designs graphical symbols specified in the dependency notation standard (SFS4612 ja IEEE/ANSI Std.91-1991) and different descriptions of function and structure of state machines. Based on this knowledge, students are able to implement and analyze digital devices consisting of ordinary simple digital components. After having assimilated the basic knowledge of digital technique, students are able to understand also the function and structure of micro controllers and micro processors.

Contents:

The principles of digital devices, Boolean algebra, numeral systems, operating principle, analysis and synthesis of combinational logic, flip-flops, operating principle, analysis and synthesis of sequential logic (state machines), physical characteristics of CMOS technology, registers and register transfers, computer memory, instruction set architecture, computer design basics, interfaces and data transmission

Mode of delivery:

Classroom

Learning activities and teaching methods:

Lessons 40 h, guidance of the project work 20 h.

Target group:

1st year BSc students

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Text books, MIT OpenCourseWare and execise literature.

Assessment methods and criteria:

Project work, home assignment and exam. Partial exams are recommended.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Project work pass/fail. Numerical grading 1-5 for exam. Final grading is based on exam.

Person responsible:

Antti Mäntyniemi

Working life cooperation:

-

Other information:

-

521286A: Computer Systems, 8 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Teemu Leppänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

521142A	Embedded Systems Programming	5.0 op

ECTS Credits:

8

Language of instruction:

Lecturing in Finnish, course and exercise material available in English.

Timing:

Autumn, periods 1-2. Will be held next time in the autumn of 2016.

Learning outcomes:

Upon completing the course, the student understands the basic computer architecture and organization. Student understands CPU operation and datapath in general. Student knows number systems and data representations in computers. Student is familiar of I/O operation with peripheral devices in general. Student is able to implement small programs with the C programming language for general-purpose computers for embedded systems. Student recognizes how embedded systems programming is different from programming general-purpose computers.

Contents:

Computer architecture and organization, CPU, memory organization and management, data types, registers and I/O, general computer and embedded systems programming, basics of the C programming language.

Mode of delivery:

Web-based and face-to-face teaching.

Learning activities and teaching methods:

Lectures (40h), course exercises (20h), laboratory exercise (3h) and course projects in groups.

Target group:

2nd year students of computer science and engineering and 3rd year students of electrical engineering.

Prerequisites and co-requisites:

Elementary programming 521141P.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Lecture notes. Mano M., Computer System Architecture. Prentice Hall, 1993. Patterson D., Hennessy J., Computer Organization and Design. Morgan Kauffman, 2005. Williams, E.: Make: AVR Programming, Learning to Write Software for Hardware, O'Reilly, 2014.

Assessment methods and criteria:

Students complete the course exercises after lectures, participate to the laboratory exercise and complete the course projects in groups. Assessment is based on the exercises and the course projects. More detailed information on assessment can be found from the course Web page, https://noppa.oulu.fi/noppa/kurssi/521286a/.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Teemu Leppänen, Mika Rautiainen.

Working life cooperation:

No.

521329A: Hands-on Course in Wireless Communication, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Heikki Antero Kärkkäinen

Opintokohteen kielet: Finnish

Leikkaavuudet:

521316A Broadband Communications Systems 4.0 op

ECTS Credits:

5

Language of instruction:

Finnish

Timing:

Autumn, period 1

Learning outcomes:

This course introduces students into problems of wireless communication technology with the aid of small laboratory exercises which do not require prior knowledge on telecommunication engineering. A student observes and learns the operation principles, properties and limitations of existing wireless communication systems with the aid of modern measurement instruments & methods used in laboratory environment. After completing the course a student can approach different kinds of wireless communication problems utilizing engineering practices.

Contents:

Students are introduced to the wireless communication systems and corresponding phenomena with the aid of guided laboratory exercises. The course utilizes various existing wireless communication systems, in order to create simple connections between various equipment and modules in a laboratory environment.

Mode of delivery:

Contact teaching and guided laboratory exercises.

Learning activities and teaching methods:

Students will participate in briefing lectures which introduce the theory needed to conduct the laboratory work items. After each lecture students will study a given problem with the aid of measuring instruments in a laboratory environment. Work items are conducted by groups of two students, and results are given in written report. Course contains 14 h of contact teaching and 28 h of laboratory work. In addition, self-study, discussion and reporting of results are performed.

Target group:

Second year bachelor level electrical engineering students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Lecture slides and problem assignments. Materials are stored into OPTIMA environment.

Assessment methods and criteria:

A group of two students participates in contact teaching and prepares a final report according teacher’s instructions. Participation in laboratory exercises is mandatory for both students of a group.

Grading:

The course unit utilizes a numerical grading scale 1-5.
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Kari Kärkkäinen

Working life cooperation:

-

Other information:

-

521457A: Software Engineering, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Röning

Opintokohteen kielet: English

Leikkaavuudet:

ay521457A Software Engineering (OPEN UNI) 5.0 op

ECTS Credits:

5

Language of instruction:

Finnish. Material available in English.

Timing:

Spring, periods 3.

Learning outcomes:

After finishing the course, the student knows the basic concepts of software and real-time systems, the different areas of project management, the phases of software development and the goals and tasks of them, is able to use structural methods for defining systems and knows the principles of object-oriented design and analysis. After the course, the student has basic knowledge of utilizing software tools for structural analysis and design.

Contents:

Problematics of software development and the special features of real-time systems in this regard. Software development is viewed in regard to project management and actual implementation: 1. process models, 2. requirements specification, 3. project management basics: design, metrics, risk management, resource management, follow up, quality control, product control, 5. structural analysis and design, 5. software testing methods and strategies, 6. introduction to object-oriented analysis and design.

Mode of delivery:

Face-to-face.

Learning activities and teaching methods:

The course consists of lectures and a laboratory design exercise. The course is completed by a final exam and a successfully completed exercise. Lectures 30 h, laboratory design (in period 3) 12 h, the rest of the self-study.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

521141P Elementary Programming, 521286A Computer Systems or 521142A Embedded Systems Programming.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

R.S. Pressman: Software Engineering - A Practitioner's Approach. Sixth Edition. McGraw-Hill 2005, chapters 1-11, 13-14 and 21-27. Older editions (4th and 5th) can also be used as a reference. In this case the lectures are based on chapters 1-20.

Assessment methods and criteria:
Final exam and accepted laboratory exercise.

Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Juha Röning
Working life cooperation:
-

A440144: Module Preparing for the Major, Environmental Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

H440127: Module Preparing for the Major, Environmental Engineering, 40 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module Preparing for the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

477011P: Introduction to Process and Environmental Engineering I, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Aki Sorsa, Sanna Taskila
Opintokohteen kielet: Finnish
Leikkaavuudet:
470219A Introduction to Process Engineering 3.5 op

ECTS Credits:
5 ECTS /133 hours of work
Language of instruction:
Finnish

Timing:

Implementation during periods 1-2 on the autumn term

Learning outcomes:

The objective of this course is to give insight to the whole perspective of process and environmental engineering and to familiarise the students with the terminology involved. In addition, the objective is also to outline the connections between process and environmental engineering and other fields closely related to them.
After the course, the student can analyse the process and environmental engineering aspects of an industrial process. He/She can, for example, divide the process into unit processes, analyse the process or a chain of processes based on the material balances, identify and evaluate the significance of essential mechanical, chemical and transport phenomena, analyse the control and process design aspects of a process etc. He/She can also evaluate the significance of different aspects of process and environmental engineering to the overall production system when these aspects are further examined in forthcoming courses.

Contents:

The course is divided into the next eight separate themes: 1. Unit processes and material balances. 2. Environmental impacts and their classification. 3. Mechanical phenomena. 4. Momentum, heat and mass transfer phenomena. 5. Chemical reactions and reactors. 6. The possibilities of biological process engineering. 7. Process dynamics and control. 8. Process measurements and measurability.

Mode of delivery:

Group work and contact lectures supporting those

Learning activities and teaching methods:

Assignments (8 altogether) carried out in small groups and contact lectures supporting them (16 hours)

Target group:

Bachelor’s degree students in the study fields of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

The course serves as an introduction to the studies in process and environmental engineering

Recommended or required reading:

The material is provided during the contact lectures and through the course webpages. It is also expected that the students seek material for completing the assignments independently.

Assessment methods and criteria:

The assignments (altogether 8) covering the course themes carried out in small groups.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilises a numerical grading scale 1-5 and fail.

Person responsible:

Dr Aki Sorsa

Working life cooperation:

No

Other information:

The assessment method utilized requires the active attendance to the group work and contact lectures from the beginning of the course

477201A: Material and Energy Balances, 5 op

Voimassaolo: 01.08.2005 - 31.12.2019
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Tiina Leiviskä

Opintokohteen kielet: Finnish

Leikkaavuudet:

477221A	Material and Energy Balances	5.0 op
470220A	Fundamentals of Chemical Process Engineering	5.0 op

ECTS Credits:

5 ECTS /133 hours of work

Language of instruction:

Finnish. The course can be completed in English as a book examination.

Timing:

Autumn period 1

Learning outcomes:

The student is able to formulate material and energy balances for a process by taking into account the restrictions set by reaction stoichiometry. The student knows how the created mathematical formulation can be exploited in process consideration.

Contents:

Formulation of material and energy balances by taking into account the effects of chemical reactions.

Mode of delivery:

Lectures and group exercise

Learning activities and teaching methods:

Lectures 40h, group work 10h and self-study 80h

Target group:

Bachelor students in of Process or Environmental Engineering

Prerequisites and co-requisites:

Basics from the course Introduction to Process Engineering

Recommended optional programme components:

-

Recommended or required reading:

Reklaitis, G.V.: Introduction to Material and Energy Balances. John Wiley & Sons, 1983. ISBN 0-471-04131-9.

Assessment methods and criteria:

During the course, there are two intermediate exams and both of them must be passed. Alternatively student can participate in final exam after the course. In addition to this, the students will be making a group exercise, which will be evaluated.
Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Dr Tiina Leiviskä

Working life cooperation:

No

Other information:

-

477401A: Thermodynamic Equilibria, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Eetu-Pekka Heikkinen

Opintokohteen kielet: Finnish

Leikkaavuudet:

470611A Metallurgy Processes 7.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the autumn semester, during period II. It is recommended to complete the course at the 2nd year of Bachelor's studies.

Learning outcomes:

Student is capable of defining chemical equilibria of the systems that are related to industrial processes and understands the relevance of equilibria (and their computational determination) as a part of process analysis, planning and control. Additionally, (s)he can define a meaningful system to be considered in computation thermodynamics; i.e. (s)he can create a computationally solvable problem based on technical problem that in itself is not solvable computationally.

Contents:

Concepts of entalphy (H), entropy (S) and Gibbs free energy (G). The effect of temperature and pressure on H, S and G. Chemical and phase equilibria. Activity and activity coefficient. Calculation of thermodynamic equilibria using equilibrium constant as well as Gibbs free energy minimisation.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Lectures, software exercise as well as other exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

'Basic Principles in Chemistry' and 'Material and Energy Balances' as prerequisities

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a education that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Material will be distributed during lectures and exercises.

Assessment methods and criteria:

Students are required to make a portfolio consisting of a learning diary and exercices. Please note that the course is organised only in Finnish.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University Lecturer Eetu-Pekka Heikkinen

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun. Course webpage (in Finnish): http://www.oulu.fi/pyomet/477401a.

488010P: Introduction to Process and Environmental Engineering II, 5 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Fabritius, Timo Matti Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

488011P	Introduction to Environmental Engineering	5.0 op
477012P	Introduction to Automation Engineering	5.0 op

ECTS Credits:

5 cr / 135 hours of work

Language of instruction:

Available only in Finnish

Timing:

The course is given in the spring semester, during periods III and IV. It is recommended to complete the course at the 1st spring semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. material management, phenomenon-based considerations and automation) and they recognize the role of different areas of the process and environmental engineering, when these areas are considered in the forthcoming courses.

Contents:

1. Environmental thinking and industrial ecology. 2. Materials in production processes. 3. Water resources and land use. 4. Municipal and industrial water supply. 5. PI diagrams. 6. Process design. 7. Control and operation of processes.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Group exercises and contact-education (14 h) that supports these exercises. Available only in Finnish.

Target group:

Students of process and environmental engineering

Prerequisites and co-requisites:

None

Recommended optional programme components:

This course is an introduction to the other courses of process and environmental engineering

Recommended or required reading:

Material will be distributed during lectures and via course www-site

Assessment methods and criteria:

Group exercises. Please note that the course is not available in English, but only in Finnish. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Timo Fabritius

Working life cooperation:

No

Other information:

It is highly recommended that the students are present already in the first lecture, since it is not possible to come along after the course has already begun.

477051A: Automation Engineering, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477601A Process Automation Systems 4.0 op

ECTS Credits:

5 ECTS /133 h of work

Language of instruction:

Finnish

Timing:

Autumn, period 1

Learning outcomes:

Students learn how to use PI diagrams, field instruments, automation systems and PLCs in design, implementation and commissioning projects. Students can configure and program the basic automation functions in DCSs and PLCs

Contents:

The operational and structural descriptions and concepts of process automation, automation commissioning projects, PI diagrams and field devices, configuration tools for automation functions, logic programming, telecommunication technology in automation, field buses, examples of commercial DCSs, PLCs and field bus systems

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures, demonstrations, configuration and logic programming exercises, excursion to a neighbouring industrial plant

Target group:

B.Sc. students in process and environmental engineering

Prerequisites and co-requisites:

477011P Introduction to process and environmental engineering I and 448010P Introduction to process and environmental engineering II are recommended

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes and handouts, manuals/handbooks

Assessment methods and criteria:

Learning diary or examination

Grading:

Numerical grading scale 1-5 or fail

Person responsible:

Jukka Hiltunen and Aki Sorsa

Working life cooperation:

No

Other information:

-

477322A: Heat and Mass Transfer, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477323A	Mass and Heat Transfer	5.0 op
477302A	Heat Transfer	3.0 op
477303A	Mass Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Implementation in autumn semester during 1 st period. It is recommended to complete the course at the third (Bachelor's) autumn semester. The course will be lectured first time in autumn 2016.

Learning outcomes:

After passing the course the student knows what happens when heat is transferred by conduction, convection and radiation. The student can describe energy transfer with differential energy balances connected with momentum balances; In macro scale the student is able to solve practical heat transfer problems by correlating heat transfer coefficients to dimensionless flow and material characteristics; With the help of these transfer coefficients the student is capable of estimating the size of heat transfer equipment, especially heat exchangers and select the most suitable and profitable types; and to Sketch large heat nets and to diminish the costs of the equipments.
The student is able to use the pinch method which optimises the number of heat exchangers and total energy consumption. He/she is also able to apply the exergy principle to make work from thermal energy. With the aid of this principle he/she will be able to divide the costs of the used energy in right proportion based on the processing stage. He/she student is able to explain diffusion as a phenomenon and the factors affecting it. He/she is able to model mass transfer in simple systems by using the theory of Fick. The student is capable of modeling diffusion by differential mass balances. He/she recognises the special features of mass transfer in turbulent systems and the role of different transport phenomena in mass transfer equipment. He/she has rudimentary practical skills applicable to the scale-up of the equipment used for absorption.

Contents:

Mechanism of heat transfer. Creating and solving differential energy balances. Heat transfer coefficient. Macroscopic balances. Selection of a proper type of heat exchanger.Scale-up and design of a heat exchanger.Design of heat exchanger networks using pinch technology.Exergy analysis for the heat flows. Diffusion. The Fick law of diffusion. Mass transfer in simple systems. Differential mass balances. Models of mass transfer in turbulent systems. Interphase mass transfer. Absorption.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

(Will be announced later)

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Kaisu Ainassaari

Working life cooperation:

No

Other information:

-

477304A: Separation Processes, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Muurinen, Esa Ilmari, Ainassaari, Kaisu Maritta

Opintokohteen kielet: Finnish

Leikkaavuudet:

470323A	Separation Processes	5.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in autumn semester during 2 nd periods. It is recommended to complete the course on the third (Bachelor's) autumn semester.

Learning outcomes:

After the course the student is able to define the position of separation processes based on mass transfer in process and environmental engineering. He/she is capable of solving phase equilibrium problems in multistage separations for binary mixtures. The student is able to explain the phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation,

membrane separations, and reactive separations. He/she recognises the equipment used for these processes and is able to compare the methods to each other with heuristic rules.

Contents:

Separation processes based on mass transfer in process and environmental engineering. Phase equilibrium problems in multistage separations for binary mixtures. Phenomena behind the following separation processes: distillation, absorption, stripping, liquid-liquid extraction, supercritical extraction, crystallisation, adsorption, chromatography separation, membrane separations, and reactive separations. Equipment used for these processes and is able to compare the methods to each other with heuristic rules, etc.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination possible in English.

Learning activities and teaching methods:

Lectures 40 h, exercises 20 h, homework 15 h and self-study 58 h. For foreign students written examination based on given literature and homework.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Courses 477301A Momentum Transfer, 477302A Heat Transfer and 477303A Mass Transfer or 477052A Fluid Mechanics and 477312A Heat and Mass Transfer are recommended beforehand.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Seader, J.D., Henley, E.J. & Roper, D.K.: Separation Processes Principles. Wiley 2011, 821 p.; Noble, R.D. & Terry, P.A.: Principles of Chemical Separations with Environmental Applications. Cambridge 2004, Cambridge University Press.321 p.

Assessment methods and criteria:

Homework assignments affect the course grade. Examination. The course can be completed with two intermediate exams or one final exam. Homework assignments affect the course grade. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Laboratory manager Dr Esa Muurinen

Working life cooperation:

No

Other information:

-

477052A: Fluid Mechanics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

477301A	Momentum Transfer	3.0 op

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish, can be completed in English as a book examination.

Timing:

Implementation in spring semester during 3 rd period. It is recommended to complete the course at the second (Bachelolor's) spring semester. The course will be lectured first time in spring 2016.

Learning outcomes:

After the course the student is able to determine the viscosity of pure substances and mixtures and to estimate the effect of temperature and pressure on viscosity. The student is able to recognise the interactions between a solid body and flowing fluid and to distinguish the forces, their directions and to calculate their magnitudes. The student is able to formulate momentum balance equations and to solve these in order to calculate velocity distribution, flow rate and pressure drop. The student is able to distinguish laminar and turbulent flow regimes from others and is able to use the correct equations according to flow regime. After the course the student is able to design pipelines and other simple flow mechanical process equipment.

Contents:

Viscosity. Mechanism of momentum transfer. Creating and solving differential momentum balances. Friction factor. Macroscopic balances. Flow in pipes and open-channels.

Mode of delivery:

Face-to-face teaching in Finnish. Book examination in English.

Learning activities and teaching methods:

Lectures 45 h, homework 15 h and self-study 73 h. For foreign students written examination based on given literature.

Target group:

Bachelor's degree students of process and environmental engineering.

Prerequisites and co-requisites:

Knowledge of solving differential equations.

Recommended optional programme components:

This is one of the courses in which physical chemistry is used in the applications of process and environmental engineering. It is part of a stream that aims at skills needed in the phenomenon-based modelling and planning of industrial processes.

Recommended or required reading:

Munson, B.R., Young, D.F. & Okiishi, T.H. Fundamentals of Fluid Mechanics.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are 5 intermediate exams. The course can also be completed by final examination. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment.

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Eero Tuomaala

Working life cooperation:

No

Other information:

-

A400072: Module Preparing for the Option, 20 - 40 op

Voimassaolo: 01.08.2007 -

Opiskelumuoto: Module Preparing for the Option

Laji: Study module
Vastuuyksikkö: Faculty of Technology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

A440171: Optional Studies, Bachelor of Science (Industrial Engineering and Management), 0 - 20 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Optional Studies
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

555200A: Bachelor's Thesis / Industrial Engineering and Management, 8 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish

ECTS Credits:
8 ECTS credits.

Language of instruction:
Finnish. The thesis can also be written in English.

Timing:
Periods 1-4.

Learning outcomes:
Upon completion of the course the student should be able to solve small problems in organizations independently. The student can create a research plan, and define a research problem and research questions. The student is able to manage his own work according to the research plan. The student can also utilize different information sources and critically evaluate the information obtained. The student can create a written report according to the instructions.

Contents:
The research topics are presented in the bachelor’s thesis seminar.

Mode of delivery:
The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:
Self-study 216 h. The student defines the research topic in co-operation with the instructor. The thesis can be a theoretical or empirical study.
Target group:
Industrial Engineering and Management students.

Prerequisites and co-requisites:
900061A Scientific Communication for Industrial Engineering and Management, 555201A Internship.
Recommended optional programme components:
The students will complete 555203A Bachelor's thesis seminar simultaneously.
Recommended or required reading:
-

Assessment methods and criteria:
This course includes writing a 25-page thesis.

Grading:
Pass-Fail

Person responsible:
Tutor teachers.

Working life cooperation:
No.

Other information:
-

555201A: Bachelor's Thesis Seminar, 2 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanna Kropsu-Vehkaperä

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS credits.

Language of instruction:
Finnish. English material is also used.

Timing:
The course is organized in the autumn and spring semester.

Learning outcomes:
Upon completion of the seminar, student is able to set and define research problem and objectives, conduct a minor empirical research through selected research methods or conduct a literature review and write an academic report. Student is also able to evaluate and review academic reports and act as an opponent.

Contents:
Information retrieval for the research, conduct research in practice, scientific writing, acting as an opponent

Mode of delivery:
The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:
Lectures 12 h, self-study 42 h.

Target group:
Industrial Engineering and Management students.

Prerequisites and co-requisites:
900061A Scientific Communication for Industrial Engineering and Management, 555201A Internship..

Recommended optional programme components:
The students will complete 030005P Information Skills and 555200A Bachelor's Thesis simultaneously.

Recommended or required reading:
The materials will be defined at the beginning of the course.

Assessment methods and criteria:
Active participation in the seminar, presenting one's own bachelor's thesis, and acting as an opponent in the seminar.

Grading:
Pass-Fail.
Person responsible:
D.Sc. Janne Härkönen
Working life cooperation:
No.

Other information:
-

555202A: Maturity Test / Bachelor of Science in Industrial Engineering and Management, 0 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555211A Maturity Test / Industrial Engineering and Management 0.0 op

Ei opintojaksokuvauksia.

A440140: Orientation studies, Product Management, 28 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

555242A: Product development, 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English

Leikkaavuudet:

ay555242A Product development (OPEN UNI) 5.0 op
555240A Basic Course in Product Development 3.0 op

ECTS Credits:

5 ECTS credits**.**

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

This course introduces product development and innovations management in a company environment. The course 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. Upon completion of the course 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. Student learns how to transform customer needs into requirements for product development process and finally into product features. 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 (U&E model, Cooper's stage-gate model, QFD), managing innovations, and product development success factors.

Mode of delivery:

The tuition will be implemented as blended teaching.

Learning activities and teaching methods:

Lectures 20 h / exercises 6 h / group work and self-study 108 h.

Target group:

Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

555226A Operations and production.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes 555225P Basics of industrial engineering and management, 555285A Project management, 555264P Managing well-being and quality of working life, and 555286A Process and quality management..

Recommended or required reading:

Handouts, course work, and a collection of articles. Ulrich, K. & Eppinger, S. (2008) Product Design and Development. McGraw-Hill. 358 p.

Assessment methods and criteria:

Assignment and final exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555240A Basic Course in Product Development.

555313S: Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 1.

Learning outcomes:

Upon completion of the course the student understands the key concepts of general management. After completing the course the student knows the historical developments in the management thought. The student has an understanding about the qualifications of a manager in a modern organization. The student understands the principles of the managerial decision making. The student can distinguish between the terms management and leadership. The student has an understanding about good managerial practices.

Contents:

Managers and Managing, The Evolution of Management Thought, Values, Attitudes, Emotions, and Culture: The Manager as a Person, Ethics and Social Responsibility, Managing Diverse Employees in a Multicultural Environment, Decision Making, The Manager as a Planner and Strategist, Managing Organizational Structure and Culture, Organizational Control and Change, Motivation and Performance, Leadership, Effective Groups and Teams, Promoting Effective Communication, Managing Conflict, Politics, and Negotiation.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, case examples 10 h, self-study 115 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Jones G. R. & George J.M (2014) Contemporary Management. McGraw-Hill. Case descriptions.

Assessment methods and criteria:

The assessment is based on the exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

555350S: Technology Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

555340S Technology Management 4.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

After finishing the course, the student will be 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, acquirement, and movement are also covered.

Mode of delivery:
The tuition will be implemented as face-to-face teaching

Learning activities and teaching methods:
Lectures 21 h / exercises, group work and self-study 113 h.

Target group:
Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:
555242A Product Development.

Recommended optional programme components:
-

Recommended or required reading:
Lecture materials and selected articles, will be defined at the beginning of the course.

Assessment methods and criteria:
Exam.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:
Professor Harri Haapasalo.

Working life cooperation:
No.

Other information:
Substitutes course 555340S Technology Management.

555351S: Advanced Course in Product Development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

555345S	Advanced Course in Product Development	6.0 op

ECTS Credits:
5 ECTS credits.
Language of instruction:
English.
Timing:
Period 2.

Learning outcomes:

Upon completion of the course the student understands the objectives of requirements engineering in order to develop sustainable products. The course familiarizes the student to requirements engineering process and its key activities. After finishing the course, the student will be able to analyze requirements engineering in product development processes. The student knows Design for Excellence (DfX) practice. The student can recognize different stakeholder specific requirements and their diversity.

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritization and valuation, Design for Excellence (DfX), different stakeholders and their requirements for product development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 20 h / group work and self-study 114 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product development, 555350S Technology management.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

Group work, exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555345S Advanced Course in Product Development.

555371S: Human Resource Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English
Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

Required proficiency level:

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 4.

Learning outcomes:

Upon completion of the course the student understands the key concepts of human resource management. He should be able to utilize methods in analyzing and planning of human resource practices in organizations. After the course, the student can participate in human resource practices planning and implementation in organizations. The student knows how to apply PCMM (People Capability Maturity Model) frameworks. The student knows the basic Finnish laws, bylaws and trade agreements in the area of human resource management.

Contents:

Organizational capability maturity. People management practices in the areas of: Staffing, Communication and Coordination, Work Environment, Performance Management, Training and Development, Compensation, Competency Analysis, Workforce Planning, Competency Development, Career Development, Competency-Based Practices, Workgroup Development and Participatory Culture. Competency Integration, Empowered Workgroups, Mentoring. Finnish laws, bylaws and trade union agreements in the area of human resource management.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, assignment guidance 10 h, group work115 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Curtis, B., Hefley, W.E., & Miller, S. (2002). People Capability Maturity Model: Guidelines for Improving the Workforce. Reading, MA: Addison-Wesley. or Curtis, B., Hefley, W.E., & Miller, S. (2009) People Capability Maturity Model (P-CMM) Version 2.0, Second Edition. http://www.sei.cmu.edu/reports/09tr003.pdf

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

555301S: Research Seminar in IEM, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-4.

Learning outcomes:

Upon completion the student knows scientific process and different research methods. The student can select an appropriate method for his/her master's thesis work. The student can evaluate validity of research work and provide constructive criticism. The student can report research findings in the form of academic research report and participate in academic discussion.

Contents:

Research approach, qualitative and quantitative research methods, structure of research report, evaluating validity of research, constructive criticism and participation in scientific discussion.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 18h, self-study 116h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

Research report is based on research work student is doing for his/her master's thesis work

Recommended or required reading:

Lecture material. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course includes lectures/seminars and active participation in discussion, presentation of own research work, providing constructive feedback on ongoing research work, evaluation of two completed M.Sc. thesis, and report written in article format of own master's thesis research work.

Grading:

The course utilizes verbal grading "Pass/Fail".

Person responsible:

Professor Jaakko Kujala.

Working life cooperation:

No.

Other information:

Seminars will include separate lectures about research approach, qualitative research methods and quantitative research methods. These lectures are recommended to be completed before starting own research work for master's thesis. Participation in these three lectures is mandatory to participate in the course and they are lectured two times a year.

555391S: Advanced Course in Project Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: English
Leikkaavuudet:

555381S Project Leadership 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

After the course, the student has an in-depth understanding of the most important project management areas, competences to identify and evaluate the most applicable managerial approaches for different types of projects and capabilities to develop project management processes in an organization.

Contents:

different type of projects and industry specific approaches to project management, managing large international projects, managing projects' external environment, project governance, project risk management, project time and schedule management

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures, web-based-lectures and workshops 36h, group exercises 36h, self-study 62h

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture and exercise material.

Assessment methods and criteria:

This course utilizes continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture (30% of the grade), group exercise presented and discussed in the workshops (30% of the grade), and exam (40% of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Assistant professor Kirsi Aaltonen

Working life cooperation:

-

Other information:

Substitutes course 555381S Project Leadership.

A440258: Major subject studies, Product Management, 62 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Compulsory

555314S: Management Information Systems, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Periods 3-4.

Learning outcomes:

Upon completion of the course, the student can explain the key concepts of management information systems. The student is familiar with the significance of information and information management in modern business process management. The student can define the information needs of management processes and understands how information systems can meet these needs. After completing the course, the student is aware of the current trends in management information systems technologies and practices. After the course, the student has readiness to participate for enterprise information system designing, purchasing, and development tasks as a role of industrial engineer/process developer. During the course, the students will also develop their skills in reflective, self-directing learning.

Contents:

Key concepts of management information systems (MIS), information systems in decision making and leadership, the effects of information technology in business processes, current trends in management information systems technologies and practices, multidisciplinary nature of information systems and their development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 14 h / learning diary 27 hours / self-study and group work 93 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent, 555313S Management.
Additional information about the course and **pre-assignments** can be found in Noppa (noppa.oulu.fi).

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment that includes a reflective learning diary (returned on a weekly basis) and conducting the learning tasks.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Hanna Kropsu-Vehkaperä.

Working life cooperation:

No.

Other information:

Substitutes the course 555344S Management Information Systems.

555343S: Product Data management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarizes a student with the product processes of an enterprise and specifically the meaning of product data in different stages of product process. After finishing the course, a student knows what product data is and how it can be used for business purpose. A student is familiar with the basic concepts of product data management (PDM) and is aware of the basic tools used for PDM. After finishing the course, a student will be able to analyze existing and future products from product structure viewpoint. Students will be able to analyze the company's product data management as a whole and to give suggestions based their analysis.

Learning outcomes:

Product information management concepts, its history and challenges, PDM-processes: managing product models, managing documents and configurations as well as tracing information, PDM-system and its functions, PDM-project and implementation of the system.

Contents:

The tuition will be implemented as face-to-face teaching.

Mode of delivery:

Lectures 16 h / group work and self-study 118 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

555242 Product development.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and selected articles. Saaksvuori A & Immonen A. (2008) Product lifecycle management, 8 ed. pages 1-65 and 91-176.

Assessment methods and criteria:

Group work report and exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

-

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Required proficiency level:

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Periods 3-4.

Learning outcomes:

The course familiarizes students with the broad concepts of product management. After finishing the course, the student understands central principles and contents of product management. Student knows the basics of product portfolio management and understands the ways to analyse products business case. A student learns to see product management as an organizational lifecycle function that focus managing all products and related actions in all product lifecycle phases. The student can apply the learned things and methods in different industries in order to develop systematic product management.

Contents:

Basic issues in product management, sub-processes that are included in product management, methods and tools for product management, product portfolio management, product business case.

Mode of delivery:
The tuition will be implemented as face-to-face learning.

Learning activities and teaching methods:
Will be defined at the beginning of the course.
Target group:
Industrial Engineering and Management and Master's Programme in Product Management students.
Prerequisites and co-requisites:
555242A Product development, 555350S Technology management.
Recommended optional programme components:
-

Recommended or required reading:
Will be defined at the beginning of the course.

Assessment methods and criteria:
Will be defined at the beginning of the course.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
Professor Harri Haapasalo.

Working life cooperation:
No.

Other information:
-

555382S: Management of a project-based firm, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jaakko Kujala
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS credits.

Language of instruction:
English.

Timing:
Period 4.

Learning outcomes:

The course provides the student with the basic skills to manage a company practicing project business. Upon completion the student can explain the management areas of project business and their essential contents. The student can compare the specific features of project business in different business environments and analyse their effect on the business model of the company. The student can evaluate the significance of a single project and its management in reaching business goals.

Contents:

The specific features of project business, business models of a project company, project sales and marketing, contracting, negotiation analytic approach, project portfolio management, management of project networks.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 24h, self-study56h, group exercise 54h

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course utilizes continuous assessment. During the course, the students must write a learning diary for each lecture and participate actively in the lectures. 40% of the grade is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jaakko Kujala

Working life cooperation:

No.

Other information:

-

555376S: Organisational development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used (the course can be completed in English as a book examination).

Timing:

Period 1.

Learning outcomes:

After completing the course student is able to explain the general models regarding organisational development and is able to adapt the most central ones to the work organisations. Student can also choose the most suitable models for different situations and can interpret the results gained from different approaches. The student is able to explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation. He is able to identify development needs and opportunities in companies and other organisations. The student also knows the basics of applying new research results in practical settings.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, security, and responsibility. Different types of indicators and applications will be discussed, such as occurrence, frequency indicators, economic indicators, and scales. Various concepts will be discussed, for example, in relation with change processes (e.g. strategy, owner, partnerships, sizes of operations and personnel), implementation, participation, intervention, action research, and learning organization.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and web-based teaching).

Learning activities and teaching methods:

Lectures 22 h / self-study 100 h / group work & exercises 12 h.

Target group:

Industrial Engineering and Management and Master’s Program in Product Management students.

Prerequisites and co-requisites:

555265P Occupational safety and health management, 555264P Managing well-being and quality of working life, 555371S Human resource management.

Recommended optional programme components:

Human resource management, 555370S Strategic management, 555377S Risk Management. Research project in industrial engineering and management related to Organisation and knowledge management topic and Faculty of Education’s Organisational psychology course can be conducted to complement this course.

Recommended or required reading:

Applicable parts of: Hatch, M. J. and Cunliffe A.N. (2013) Organization Theory, Modern, Symbolic, and Postmodern Perspectives. Third Edition, Oxford University Press. Väyrynen, S., Häkkinen, K., Niskanen, T. (Eds.) (2015). Integrated Occupational Safety and Health Management - Solutions and Industrial Cases. Springer, Production & Process Engineering. 248 p. Other literature will be informed at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (50 % weight).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Seppo Väyrynen

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

555333S: Production Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: English
Leikkaavuudet:

555322S Production Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student understands the key concepts of operations and production management. The student should know the essential production strategies. The student should also understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analyzing and constructing development plans for production organizations. Upon completion of the course the student can apply the management methods also in service systems. The student also understands the principles of the sustainable development in production.

Contents:

Production strategies, sustainable development, Supply Chain Management, Just-In-Time (JIT), Theory of Constraints (TOC), Lean, Toyota Production System (TPS), management of the production of services.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 20 h, assignment guidance 20 h, group work 95 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Liker J (2004) The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. Goldratt, E. M. (2012) The Goal: A Process of Ongoing Improvement. Material delivered during the lectures.

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555322S Production Management.

555375S: Lab to Market, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: English
Leikkaavuudet:

555327S Seminar in Production Management : Lab to Market 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student should be able to analyze an industry to identify viable business ideas and opportunities. He/she can use different frameworks including scenario planning, customer driven analysis, user needs analysis, and technology evolution analysis. The student can apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilize frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective. The student can also present and defend own ideas, and critically examine and discuss the recommendations of others.

Contents:

Industry analysis, scenario planning, customer driven analysis, user needs analysis, technology evolution analysis, opportunity identification, business models.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 28 h / self-study and group work 106 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are mandatory individual assignments (75 % of the grade) and a group work (25 % of the grade).

Grading:

1-5.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555327S Lab to Market.

555304S: Advanced Internship, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Practical training
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555311S Advanced Internship 3.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish/ English

Timing:

Internship is usually performed while working in summertime during the Master's studies. It is recomendated to report the internship experience on the 2nd autumn semester in Master's Studies. Course is organized twice in a year. Reporting is performed during periods 1 - 2 or 3 - 4.

Target group:

Industrial Engineering and Management Master's students

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Grading:

pass/ fail

Person responsible:

Study Advisor of Industrial and Engineering and Management Degree Programme

Working life cooperation:

Yes

Other information:

Substitutes the course 555311S Advanced Internship 3 or 6 ECTS cr.

555378S: Seminar in industrial engineering and management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555385S	Advanced Course in Quality Management	5.0 op
555386S	Advanced Course in Project Management	5.0 op
555347S	Seminar in Technology Management	5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English.

Timing:

Periods 1-4.

Learning outcomes:

Learning outcomes depend on the content of each seminar. The seminar topics are related to production management, product management, organization and knowledge management, project management, and process and quality management.

Contents:

Will be defined at the beginning of the course.

Mode of delivery:
Will be defined at the beginning of the course.

Learning activities and teaching methods:
Will be defined at the beginning of the course.

Target group:
Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:
-

Recommended or required reading:
Will be defined at the beginning of the course.

Assessment methods and criteria:
Will be defined at the beginning of the course.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
-

Working life cooperation:
-

Other information:
Substitutes courses 555347S Seminar in Product Management, 555385S
Research Project in Quality Management and 555386S Research Project in Project Management.

555379S: Research Project in Industrial Engineering and Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555367S	Exercises in Work Science	6.0 op
555387S	Project Work in Quality Management	5.0 op
555388S	Project Work in Project Management	5.0 op
555326S	Research Project in Production Management	5.0 op
555348S	Research project in product development management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English.

Timing:

Periods 1-4.

Learning outcomes:

Learning outcomes depend on the project work contents.

Contents:

Project work topics and types vary. The topics are typically related to actual problems in the industry.

Mode of delivery:

Will be defined at the beginning of the course.

Learning activities and teaching methods:

The methods are agreed with the project work instructor. The work can be done individually or in a group.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

The assessment is based on the project work report.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

-

Working life cooperation:

-

Other information:

The objective of the course is to apply the methods of industrial engineering and management in a company's development activities. The course provides the student with an opportunity to combine and apply his/her existing knowledge in a study project. The student familiarises himself/herself with research work and reporting of the results. Substitutes courses 555326S Research Project in Production Management, 555348S Research Project in Product Management, 555367S Exercises in Work Science 555387S Research Project in Quality Management and 555388S Research Project in Project Management.

555300S: Master's Thesis, 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

470099S Master's Thesis in Industrial Engineering and Management 30.0 op

ECTS Credits:
30 ECTS credits.

Language of instruction:
Finnish / English.

Timing:
Periods 1-4.

Learning outcomes:

Upon completion of the course the student should be able to solve challenging problems in organizations independently. The student can create a research plan, and define a research problem and research questions. The student is able to manage his own work according to the research plan. The student can also utilize different information sources and critically evaluate the information obtained. The student can create a written report according to the instructions.
Contents:
The research topic is selected in co-operation with the instructor.

Mode of delivery:
The tuition will be implemented as self-study and face-to-face teaching.
Learning activities and teaching methods:
Self-study 804 h. The student defines the research topic in co-operation with the instructor. The thesis can be a theoretical

Target group:
Industrial Engineering and Management students and Master’s Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.
Recommended optional programme components:
The students will complete 555301S Research seminar in industrial engineering and management simultaneously.
Recommended or required reading:
-

Assessment methods and criteria:
This course includes writing a Master’s Thesis.

Grading:
1-5.

Person responsible:
Industrial Engineering and Management professors and doctors.

Working life cooperation:
Yes.

Other information:
Substitutes course 477991S Master’s Thesis.

555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555312S Maturity Test / Industrial Engineering and Management 0.0 op

Ei opintojaksokuvauksia.

A440227: Major Studies / Common Studies, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Common studies

555313S: Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits.

Language of instruction:
English

Timing:
Period 1.

Learning outcomes:
Upon completion of the course the student understands the key concepts of general management. After completing the course the student knows the historical developments in the management thought. The student has an understanding about the qualifications of a manager in a modern organization. The student understands the principles of the managerial decision making. The student can distinguish between the terms management and leadership. The student has an understanding about good managerial practices.

Contents:

Managers and Managing, The Evolution of Management Thought, Values, Attitudes, Emotions, and Culture: The Manager as a Person, Ethics and Social Responsibility, Managing Diverse Employees in a Multicultural Environment, Decision Making, The Manager as a Planner and Strategist, Managing Organizational Structure and Culture, Organizational Control and Change, Motivation and Performance, Leadership, Effective Groups and Teams, Promoting Effective Communication, Managing Conflict, Politics, and Negotiation.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, case examples 10 h, self-study 115 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Jones G. R. & George J.M (2014) Contemporary Management. McGraw-Hill. Case descriptions.

Assessment methods and criteria:

The assessment is based on the exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

555314S: Management Information Systems, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Periods 3-4.

Learning outcomes:

Upon completion of the course, the student can explain the key concepts of management information systems. The student is familiar with the significance of information and information management in modern business process management. The student can define the information needs of management processes and understands how information systems can meet these needs. After completing the course, the student is aware of the current trends in management information systems technologies and practices. After the course, the student has readiness to participate for enterprise information system designing, purchasing, and development tasks as a role of industrial engineer/process developer. During the course, the students will also develop their skills in reflective, self-directing learning.

Contents:

Key concepts of management information systems (MIS), information systems in decision making and leadership, the effects of information technology in business processes, current trends in management information systems technologies and practices, multidisciplinary nature of information systems and their development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 14 h / learning diary 27 hours / self-study and group work 93 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent, 555313S Management.
Additional information about the course and **pre-assignments** can be found in Noppa (noppa.oulu.fi).

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment that includes a reflective learning diary (returned on a weekly basis) and conducting the learning tasks.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Hanna Kropsu-Vehkaperä.

Working life cooperation:

No.

Other information:

Substitutes the course 555344S Management Information Systems.

555301S: Research Seminar in IEM, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 1-4.

Learning outcomes:

Upon completion the student knows scientific process and different research methods. The student can select an appropriate method for his/her master's thesis work. The student can evaluate validity of research work and provide constructive criticism. The student can report research findings in the form of academic research report and participate in academic discussion.

Contents:

Research approach, qualitative and quantitative research methods, structure of research report, evaluating validity of research, constructive criticism and participation in scientific discussion.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 18h, self-study 116h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

Research report is based on research work student is doing for his/her master's thesis work

Recommended or required reading:

Lecture material. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course includes lectures/seminars and active participation in discussion, presentation of own research work, providing constructive feedback on ongoing research work, evaluation of two completed M.Sc. thesis, and report written in article format of own master's thesis research work.

Grading:

The course utilizes verbal grading "Pass/Fail".

Person responsible:

Professor Jaakko Kujala.

Working life cooperation:

No.

Other information:

Seminars will include separate lectures about research approach, qualitative research methods and quantitative research methods. These lectures are recommended to be completed before starting own research work for master's thesis. Participation in these three lectures is mandatory to participate in the course and they are lectured two times a year.

555304S: Advanced Internship, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Practical training
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555311S Advanced Internship 3.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish/ English

Timing:

Internship is usually performed while working in summertime during the Master's studies. It is recomendated to report the internship experience on the 2nd autumn semester in Master's Studies. Course is organized twice in a year. Reporting is performed during periods 1 - 2 or 3 - 4.

Target group:

Industrial Engineering and Management Master's students

Prerequisites and co-requisites:

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Recommended optional programme components:

-

Grading:

pass/ fail

Person responsible:

Study Advisor of Industrial and Engineering and Management Degree Programme

Working life cooperation:

Yes

Other information:

Substitutes the course 555311S Advanced Internship 3 or 6 ECTS cr.

A440228: Major Studies / Product Management, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option

Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies in Product Management

555350S: Technology Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi
Opintokohteen kielet: English
Leikkaavuudet:

555340S Technology Management 4.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

After finishing the course, the student will be 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, acquirement, and movement are also covered.

Mode of delivery:

The tuition will be implemented as face-to-face teaching

Learning activities and teaching methods:

Lectures 21 h / exercises, group work and self-study 113 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product Development.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and selected articles, will be defined at the beginning of the course.

Assessment methods and criteria:

Exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555340S Technology Management.

555343S: Product Data management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarizes a student with the product processes of an enterprise and specifically the meaning of product data in different stages of product process. After finishing the course, a student knows what product data is and how it can be used for business purpose. A student is familiar with the basic concepts of product data management (PDM) and is aware of the basic tools used for PDM. After finishing the course, a student will be able to analyze existing and future products from product structure viewpoint. Students will be able to analyze the company's product data management as a whole and to give suggestions based their analysis.

Learning outcomes:

Product information management concepts, its history and challenges, PDM-processes: managing product models, managing documents and configurations as well as tracing information, PDM-system and its functions, PDM-project and implementation of the system.

Contents:
The tuition will be implemented as face-to-face teaching.

Mode of delivery:
Lectures 16 h / group work and self-study 118 h.

Target group:
Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:
555242 Product development.

Recommended optional programme components:
-

Recommended or required reading:
Lecture materials and selected articles. Saaksvuori A & Immonen A. (2008) Product lifecycle management, 8 ed. pages 1-65 and 91-176.

Assessment methods and criteria:
Group work report and exam.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:
Professor Harri Haapasalo.

Working life cooperation:
No.

Other information:
-

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Arto Tolonen
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Required proficiency level:

ECTS Credits:
5 ECTS credits.

Language of instruction:
English.

Timing:

Periods 3-4.

Learning outcomes:

The course familiarizes students with the broad concepts of product management. After finishing the course, the student understands central principles and contents of product management. Student knows the basics of product portfolio management and understands the ways to analyse products business case. A student learns to see product management as an organizational lifecycle function that focus managing all products and related actions in all product lifecycle phases. The student can apply the learned things and methods in different industries in order to develop systematic product management.

Contents:

Basic issues in product management, sub-processes that are included in product management, methods and tools for product management, product portfolio management, product business case.

Mode of delivery:

The tuition will be implemented as face-to-face learning.

Learning activities and teaching methods:

Will be defined at the beginning of the course.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product development, 555350S Technology management.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

Will be defined at the beginning of the course.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

-

555351S: Advanced Course in Product Development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Haapasalo, Harri Jouni Olavi

Opintokohteen kielet: English

Leikkaavuudet:

555345S Advanced Course in Product Development 6.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student understands the objectives of requirements engineering in order to develop sustainable products. The course familiarizes the student to requirements engineering process and its key activities. After finishing the course, the student will be able to analyze requirements engineering in product development processes. The student knows Design for Excellence (DfX) practice. The student can recognize different stakeholder specific requirements and their diversity.

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritization and valuation, Design for Excellence (DfX), different stakeholders and their requirements for product development.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 20 h / group work and self-study 114 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

555242A Product development, 555350S Technology management.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

Group work, exam.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail..

Person responsible:

Professor Harri Haapasalo.

Working life cooperation:

No.

Other information:

Substitutes course 555345S Advanced Course in Product Development.

A440229: Major Studies/ Production Management, Advanced Module, 20 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Module of the Option
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies in Production Management

555330S: Sourcing Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish
Leikkaavuudet:

555323S Sourcing Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material will also be used.

Timing:

Period 2

Learning outcomes:

The course familiarizes a student with the overall concept of sourcing management. After completing the course student knows the key concepts of sourcing and purchase management and can explain these. The student can describe the structures of sourcing and purchasing organizations and can explain the meaning of sourcing management in the performance of operations. The student can analyze the purchasing activities in a company and can produce improvement proposals based on the analysis. After the course the student can take part in the sourcing development in the role of an expert.

Contents:

Purchasing operations in a manufacturing company, the principles of the sourcing and purchasing strategy and practices, suppliers and products, IT systems for sourcing and purchase.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, assignment guidance 10 h, group work 115 hrs.

Target group:
Industrial Engineering Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:
-

Recommended or required reading:
Lecture notes. Other material will be defined at the beginning of the course.

Assessment methods and criteria:
The assessment is based on the group work.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
Professor Pekka Kess

Working life cooperation:
No.

Other information:
Substitutes course 555323S Sourcing Management.

555331S: Advanced Supply Chain Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555324S	Advanced Supply Chain Management	3.0 op

ECTS Credits:
5 ECTS credits.

Language of instruction:
Finnish. English material is also used.

Timing:
Periods 3-4.

Learning outcomes:

Upon completion of the course the student should be able to define supply chain management concepts, describe supply chain structures, and explain the importance of effective supply chain management. He /she can analyze supply chain operations and propose development areas based on the analysis. After the course, the student can act in an expert role in supply chain development.

Contents:

Supply chain management concepts, supply chain structures, effectiveness of supply chain, supply chain analysis and development.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 8 h / exercises 4 h / group work 68 h / self-study 54 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Sakki, J. (2009) Tilaus-toimitusketjun hallinta. Jouni Sakki Oy. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The grade will be based on the group work (60 % of the grade) and book examination (40 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555324S Advanced Supply Chain Management.

555332S: Operations Research, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: Finnish
Leikkaavuudet:

555342S Operations Research 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Period 4.

Learning outcomes:

Upon completion of the course the student knows the basic concepts of operations research and its applications in operations and production activities and decision-making in companies. The student is capable of applying quantitative methods typical to the field of operations research in practical problem solving.

Contents:

What is operations research, linear and dynamic programming, network and transportation algorithms, decision analysis, inventory models, queueing systems, simulation modeling.

Mode of delivery:

The tuition will be implemented as face-to-face teaching (lectures, classroom exercises and group work).

Learning activities and teaching methods:

Lectures 20 h / classroom exercises 20 h / independent study and group work 94 h.

Target group:

Industrial engineering and management students.

Prerequisites and co-requisites:

Bachelor in industrial engineering and management or equivalent.

Recommended optional programme components:

-.

Recommended or required reading:

Taha, H. A. (2011) Operations Research: An Introduction, 9/E. Prentice Hall, 832 pp. and material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the required coursework consisting of the exercises handed out during the classroom study and a supporting analytic exercise.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess, Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555342S Operations Research.

555333S: Production Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kess, Pekka Antero
Opintokohteen kielet: English
Leikkaavuudet:

555322S Production Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student understands the key concepts of operations and production management. The student should know the essential production strategies. The student should also understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analyzing and constructing development plans for production organizations. Upon completion of the course the student can apply the management methods also in service systems. The student also understands the principles of the sustainable development in production.

Contents:

Production strategies, sustainable development, Supply Chain Management, Just-In-Time (JIT), Theory of Constraints (TOC), Lean, Toyota Production System (TPS), management of the production of services.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 20 h, assignment guidance 20 h, group work 95 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Liker J (2004) The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. Goldratt, E. M. (2012) The Goal: A Process of Ongoing Improvement. Material delivered during the lectures.

Assessment methods and criteria:
The assessment is based on the group work.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
Professor Pekka Kess

Working life cooperation:
No.

Other information:
Substitutes course 555322S Production Management.

A440259: Complementary Study Module of the Major/ Organization and Knowledge management, Advanced Module, 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Organisation and knowledge management

555370S: Strategic Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: English
Leikkaavuudet:

555320S	Strategic Management	5.0 op

ECTS Credits:
5 ECTS credits.

Language of instruction:
English.

Timing:
Period 1.

Learning outcomes:
Upon completion of the course the student should be able to utilize strategic thinking, planning, and management. He/she can analyze and plan complex global business operations. After the course, the

student can participate in strategic planning and strategy implementation in organizations. The student knows how to apply strategy analysis frameworks and analyze the implementation of the chosen strategy.

Contents:

Strategic thinking, strategic planning, strategic management, strategy analysis frameworks, strategy implementation with a simulation, analysis of the strategy implementation.

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures 6 h / exercises 6 h / group work 122 h. Alternatively independent learning method: book examination 134 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

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Recommended or required reading:

Isoherranen, V. (2012) Strategy analysis frameworks for strategy orientation and focus, University of Oulu, Faculty of Technology, Industrial Engineering and Management. Mintzberg, H. et al. (2009) Strategy safari: the complete guide through the wilds of strategic management, 2nd ed. Harlow, FT Prentice Hall.

Assessment methods and criteria:

This course utilizes continuous assessment. The group work includes the creation of strategic plan (10 % of the grade), business simulation (30 % of the grade), and the analysis of the strategy (60 % of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555320S Strategic Management.

555371S: Human Resource Management, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

Required proficiency level:

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 4.

Learning outcomes:

Upon completion of the course the student understands the key concepts of human resource management. He should be able to utilize methods in analyzing and planning of human resource practices in organizations. After the course, the student can participate in human resource practices planning and implementation in organizations. The student knows how to apply PCMM (People Capability Maturity Model) frameworks. The student knows the basic Finnish laws, bylaws and trade agreements in the area of human resource management.

Contents:

Organizational capability maturity. People management practices in the areas of: Staffing, Communication and Coordination, Work Environment, Performance Management, Training and Development, Compensation, Competency Analysis, Workforce Planning, Competency Development, Career Development, Competency-Based Practices, Workgroup Development and Participatory Culture. Competency Integration, Empowered Workgroups, Mentoring. Finnish laws, bylaws and trade union agreements in the area of human resource management.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and a supervised group work).

Learning activities and teaching methods:

Lectures 10 h, assignment guidance 10 h, group work115 h.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Curtis, B., Hefley, W.E., & Miller, S. (2002). People Capability Maturity Model: Guidelines for Improving the Workforce. Reading, MA: Addison-Wesley. or Curtis, B., Hefley, W.E., & Miller, S. (2009) People Capability Maturity Model (P-CMM) Version 2.0, Second Edition. http://www.sei.cmu.edu/reports/09tr003.pdf

Assessment methods and criteria:

The assessment is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Pekka Kess

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

A440260: Complementary Study Module of the Major/ Project Management, Advanced Module, 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Project Management

555391S: Advanced Course in Project Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: English
Leikkaavuudet:

555381S Project Leadership 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 1.

Learning outcomes:

After the course, the student has an in-depth understanding of the most important project management areas, competences to identify and evaluate the most applicable managerial approaches for different types of projects and capabilities to develop project management processes in an organization.

Contents:

different type of projects and industry specific approaches to project management, managing large international projects, managing projects' external environment, project governance, project risk management, project time and schedule management

Mode of delivery:

The tuition will be implemented as blended teaching (web-based teaching and face-to-face teaching).

Learning activities and teaching methods:

Lectures, web-based-lectures and workshops 36h, group exercises 36h, self-study 62h

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture and exercise material.

Assessment methods and criteria:

This course utilizes continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture (30% of the grade), group exercise presented and discussed in the workshops (30% of the grade), and exam (40% of the grade).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Assistant professor Kirsi Aaltonen

Working life cooperation:

-

Other information:

Substitutes course 555381S Project Leadership.

555382S: Management of a project-based firm, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jaakko Kujala
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 4.

Learning outcomes:

The course provides the student with the basic skills to manage a company practicing project business. Upon completion the student can explain the management areas of project business and their essential contents. The student can compare the specific features of project business in different business environments and analyse their effect on the business model of the company. The student can evaluate the significance of a single project and its management in reaching business goals.

Contents:

The specific features of project business, business models of a project company, project sales and marketing, contracting, negotiation analytic approach, project portfolio management, management of project networks.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 24h, self-study56h, group exercise 54h

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

The course utilizes continuous assessment. During the course, the students must write a learning diary for each lecture and participate actively in the lectures. 40% of the grade is based on the group work.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jaakko Kujala

Working life cooperation:

No.

Other information:

-

A440261: Complementary Study Module of the Major/ Process and Quality Management, Advanced Module, 15 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Obligatory studies of Process and Quality Management

555390S: Statistical Process Management, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Osmo Kauppila

Opintokohteen kielet: Finnish

Leikkaavuudet:

555380S Quality Management 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish.

Timing:

Period 1.

Learning outcomes:

Upon completion the student can analyze and improve the processes of an organization with the help of statistical tools. The student is able to disseminate the applicability of various statistical tools and methods in different kinds of organizational environments.

Contents:

Processes in an organization from a statistical viewpoint, tools and methods of statistical process control, process improvement using numeric data, stages, challenges and implementation of data analysis, the role of statistical methods in various management philosophies.

Mode of delivery:

The tuition will be implemented as face-to-face teaching (integrated classroom lectures and exercises).

Learning activities and teaching methods:

28 h lectures, 105 h independent study on course exercises.

Target group:

Industrial Engineering and Management students and other students studying taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

555286A Process and Quality Management

Recommended optional programme components:

-

Recommended or required reading:

The study materials will be announced at the beginning of the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises and an accompanying course assignment. The course grade is calculated based on the grades of these two course components.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555380S Quality Management.

555389S: Systematic Process Improvement, 10 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Osmo Kauppila
Opintokohteen kielet: Finnish

ECTS Credits:

10 ECTS credits.

Language of instruction:

Finnish

Timing:

Periods 1 - 2

Learning outcomes:

Upon completion the student can manage the improvement and problem solving in a process using quality management tools. The student can explain the steps of the DMAIC problem solving model and apply the correct tools for each step. The student is able to apply quality tools into real life process data with the help of MINITAB software and to analyse the results. The student increases his/her understanding of the process type studied in the course exercise.

Contents:

Problem solving using DMAIC, the Six Sigma body of knowledge quality tools, use of MINITAB software, process improvement in practice.

Mode of delivery:

The tuition will be implemented as blended teaching.

Learning activities and teaching methods:

Lectures and related exercises, site visit, a large group exercise related to a process operating in practice.

Target group:

Industrial Engineering and Management students, other students taking Industrial Engineering and Management as minor, postgraduate students.

Prerequisites and co-requisites:

Bachelor in Industrial Engineering and Management or equivalent. Basic knowledge of statistical process control.

Recommended optional programme components:

-

Recommended or required reading:

Kubiak, TM & Benbow DW (2009) The Certified Six Sigma Black Belt Handbook, Second Edition. ASQ Quality Press, Milwaukee. 620 s. and material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the group work as an active team member, take part in the course lectures and return the related exercises.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Osmo Kauppila.

Working life cooperation:

-

Other information:

-

A440262: Complementary Study Module of the Major/ Elective studies, Advanced Module, 5 - 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Advanced elective studies

555376S: Organisational development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

555360S Administration, Organization and Education in Working Life 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used (the course can be completed in English as a book examination).

Timing:

Period 1.

Learning outcomes:

After completing the course student is able to explain the general models regarding organisational development and is able to adapt the most central ones to the work organisations. Student can also choose the most suitable models for different situations and can interpret the results gained from different approaches. The student is able to explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation. He is able to identify development needs and opportunities in companies and other organisations. The student also knows the basics of applying new research results in practical settings.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, security, and responsibility. Different types of indicators and applications will be discussed, such as occurrence, frequency indicators, economic indicators, and scales. Various concepts will be discussed, for example, in relation with change processes (e.g. strategy, owner, partnerships, sizes of operations and personnel), implementation, participation, intervention, action research, and learning organization.

Mode of delivery:

The tuition will be implemented as blended teaching (face-to-face teaching and web-based teaching).

Learning activities and teaching methods:

Lectures 22 h / self-study 100 h / group work & exercises 12 h.

Target group:

Industrial Engineering and Management and Master’s Program in Product Management students.

Prerequisites and co-requisites:

555265P Occupational safety and health management, 555264P Managing well-being and quality of working life, 555371S Human resource management.

Recommended optional programme components:

Human resource management, 555370S Strategic management, 555377S Risk Management. Research project in industrial engineering and management related to Organisation and knowledge management topic and Faculty of Education’s Organisational psychology course can be conducted to complement this course.

Recommended or required reading:

Applicable parts of: Hatch, M. J. and Cunliffe A.N. (2013) Organization Theory, Modern, Symbolic, and Postmodern Perspectives. Third Edition, Oxford University Press. Väyrynen, S., Häkkinen, K., Niskanen, T. (Eds.) (2015). Integrated Occupational Safety and Health Management - Solutions and Industrial Cases. Springer, Production & Process Engineering. 248 p. Other literature will be informed at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (50 % weight).

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Seppo Väyrynen

Working life cooperation:

No.

Other information:

Substitutes course 555360S Administration, Organization and Education in Working Life.

555375S: Lab to Market, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: English
Leikkaavuudet:

555327S Seminar in Production Management : Lab to Market 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English.

Timing:

Period 2.

Learning outcomes:

Upon completion of the course the student should be able to analyze an industry to identify viable business ideas and opportunities. He/she can use different frameworks including scenario planning, customer driven analysis, user needs analysis, and technology evolution analysis. The student can apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilize frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective. The student can also present and defend own ideas, and critically examine and discuss the recommendations of others.

Contents:

Industry analysis, scenario planning, customer driven analysis, user needs analysis, technology evolution analysis, opportunity identification, business models.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 28 h / self-study and group work 106 h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials. Other materials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are mandatory individual assignments (75 % of the grade) and a group work (25 % of the grade).

Grading:

1-5.

Person responsible:

D.Sc. Jukka Majava.

Working life cooperation:

No.

Other information:

Substitutes course 555327S Lab to Market.

555377S: Risk Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: English
Leikkaavuudet:

555321S Risk Management 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 2.

Learning outcomes:

The objective of the course is to provide a student an overall perspective to risk management in organizations. Upon completion the student can explain the key concepts of risk and uncertainty management, classify risks, conduct systematic risk analyses, apply risk management methods and tools and make informed improvement suggestions related to risk management in organizations. The student understands the role of risk management in organizations and can compare

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification, systematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organizing of risk management, risk management in different contexts, risk governance.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures 26h, self-study 54h, group assignment 54h.

Target group:

Industrial Engineering and Management and Master’s Programme in Product Management students..

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture. The materials will be defined at the beginning of the course.

Assessment methods and criteria:

Group assignment, in-class case assignments, exam. Course grading is based on exam and group assignment.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

No.

Other information:

Substitutes course 555321S Risk Management.

555378S: Seminar in industrial engineering and management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555385S	Advanced Course in Quality Management	5.0 op
555386S	Advanced Course in Project Management	5.0 op
555347S	Seminar in Technology Management	5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English.

Timing:

Periods 1-4.

Learning outcomes:

Learning outcomes depend on the content of each seminar. The seminar topics are related to production management, product management, organization and knowledge management, project management, and process and quality management.

Contents:
Will be defined at the beginning of the course.

Mode of delivery:
Will be defined at the beginning of the course.

Learning activities and teaching methods:
Will be defined at the beginning of the course.

Target group:
Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:
-

Recommended or required reading:
Will be defined at the beginning of the course.

Assessment methods and criteria:
Will be defined at the beginning of the course.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
-

Working life cooperation:
-

Other information:
Substitutes courses 555347S Seminar in Product Management, 555385S
Research Project in Quality Management and 555386S Research Project in Project Management.

555379S: Research Project in Industrial Engineering and Management, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555367S	Exercises in Work Science	6.0 op
555387S	Project Work in Quality Management	5.0 op
555388S	Project Work in Project Management	5.0 op
555326S	Research Project in Production Management	5.0 op

555348S Research project in product development management 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English.

Timing:

Periods 1-4.

Learning outcomes:

Learning outcomes depend on the project work contents.

Contents:

Project work topics and types vary. The topics are typically related to actual problems in the industry.

Mode of delivery:

Will be defined at the beginning of the course.

Learning activities and teaching methods:

The methods are agreed with the project work instructor. The work can be done individually or in a group.

Target group:

Industrial Engineering and Management and Master's Programme in Product Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent.

Recommended optional programme components:

-

Recommended or required reading:

Will be defined at the beginning of the course.

Assessment methods and criteria:

The assessment is based on the project work report.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

-

Working life cooperation:

-

Other information:

The objective of the course is to apply the methods of industrial engineering and management in a company's development activities. The course provides the student with an opportunity to combine and apply his/her existing knowledge in a study project. The student familiarises himself/herself with research work and reporting of the results. Substitutes courses 555326S Research Project in Production Management, 555348S Research Project in Product Management, 555367S Exercises in Work Science 555387S Research Project in Quality Management and 555388S Research Project in Project Management.

A440265: Complementary Module, Biomedical Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440266: Complementary Module, Software Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440249: Supplementary Module, Process Engineering, 20 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Supplementary Module
Laji: Study module

Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440263: Complementary Module, Civil Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440267: Complementary Module, Information Engineering, 20 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A440269: Special Module, 0 - 10 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Special Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

555300S: Master's Thesis, 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

470099S Master's Thesis in Industrial Engineering and Management 30.0 op

ECTS Credits:
30 ECTS credits.

Language of instruction:
Finnish / English.

Timing:
Periods 1-4.

Learning outcomes:

Upon completion of the course the student should be able to solve challenging problems in organizations independently. The student can create a research plan, and define a research problem and research questions. The student is able to manage his own work according to the research plan. The student can also utilize different information sources and critically evaluate the information obtained. The student can create a written report according to the instructions.
Contents:
The research topic is selected in co-operation with the instructor.

Mode of delivery:
The tuition will be implemented as self-study and face-to-face teaching.
Learning activities and teaching methods:
Self-study 804 h. The student defines the research topic in co-operation with the instructor. The thesis can be a theoretical

Target group:
Industrial Engineering and Management students and Master’s Programme in Product Management students.

Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent.
Recommended optional programme components:
The students will complete 555301S Research seminar in industrial engineering and management simultaneously.
Recommended or required reading:
-

Assessment methods and criteria:
This course includes writing a Master’s Thesis.

Grading:
1-5.

Person responsible:
Industrial Engineering and Management professors and doctors.

Working life cooperation:
Yes.

Other information:
Substitutes course 477991S Master’s Thesis.

555302S: Maturity Test / Master of Science in Industrial Engineering and Management, 0 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka Majava
Opintokohteen kielet: Finnish
Leikkaavuudet:

555312S	Maturity Test / Industrial Engineering and Management	0.0 op

Ei opintojaksokuvauksia.

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

764163P-01: Basic biophysics (part 1): Introduction to biophysics, 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

764163P	Basic biophysics	5.0 op
764103P	Introduction to biophysics	2.0 op
764162P	Introduction to biophysics	3.0 op

Ei opintojaksokuvauksia.

764163P-02: Basic biophysics (part 2), 0 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

764163P	Basic biophysics	5.0 op
764103P	Introduction to biophysics	2.0 op
764162P	Introduction to biophysics	3.0 op

Ei opintojaksokuvauksia.