Opasraportti

FTech - Field of Industrial Engineering and Management (2017 - 2018)

Tutkintorakenteet

Master of Science in Technology, Industrial Engineering and Management/ Production Management

Tutkintorakenteen tila: published

Lukuvuosi: 2017-18

Lukuvuoden alkamispäivämäärä: 01.08.2017

MAJOR STUDIES: Common, 20 ECTS cr (vähintään 20 op)

555307M: Common Studies of the Majors in other Universities /Institutes, 0 - 30 op
A440227: Major Studies / Common Studies, Advanced Module, 20 op
- *Common studies*
  - 555313S: Management, 5 op
  - 555314S: Management Information Systems, 5 op
  - 555301S: Research Seminar, 5 op
  - 555304S: Advanced Internship, 5 op

MAJOR STUDIES: Advanced, 20 ECTS cr (vähintään 20 op)

555308M: Advanced Studies of the Majors in other Universities /Institutes, 0 - 30 op
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 MODULE 1: Supplementary studies, 20 ECTS cr (vähintään 20 op)

Total extent of the major studies (common and major's compulsory) and supplementary module1 should be together at least 60 ECTS cr. If the total extent is exceeded at least with 10 ECTS cr, then the special module should not be included in the study plan.

1. Select 1 - 2 of modules 11 - 13. Language of instruction in module 13 is Finnish.
2. If necessary fill the modules with elective advanced studies (list is included in modules) so that the total extend of the major studies is at least 60 ECTS cr.

Module 11: 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
- *Electives*
  - 555375S: Lab to Market, 5 op
  - 555376S: Sustainable organisational development, 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

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

Module 12: 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
- *Elective advanced studies*
  - 555375S: Lab to Market, 5 op
  - 555376S: Sustainable organisational development, 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
- *Studies in Organisation and knowledge management*
  - 555370S: Strategic Management, 5 op
  - 555371S: Human Resource Management, 5 op

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

Module 13: 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
- *Electives*
  - 555375S: Lab to Market, 5 op
  - 555376S: Sustainable organisational development, 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
  - 555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

SUPPLEMENTARY MODULE 2: Engineering and other IEM studies, 20 ECTS cr (vähintään 20 op)

Master's Programme student (2 year education) should select 'other IEM' studies.

Degree Programme student (5 year education) should select 'engineering' studies.

Other Industrial Engineering and Management Studies

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440270: Complementary Module, Other Industrial Engineering and Management Studies, 20 - 30 op
- *Elective intermediate studies (max 10 cr)*
  - 555226A: Operations and supply chain management, 5 op

555242A: Product development, 5 op
555285A: Project management, 5 op
555286A: Process and quality management, 5 op

Elective advanced studies

555330S: Sourcing Management, 5 op
555331S: Advanced Supply Chain Management, 5 op
555332S: Operations Research, 5 op
555333S: Production Management, 5 op
555350S: Research and Technology Management, 5 op
555351S: Advanced Course in Product Development, 5 op
555343S: Product Data and product life cycle management, 5 op
555346S: Product portfolio management, 5 op
555370S: Strategic Management, 5 op
555371S: Human Resource Management, 5 op
555391S: Advanced Course in Project Management, 5 op
555382S: Management of a project-based firm, 5 op
555390S: Statistical Process Management, 5 op
555389S: Systematic Process Improvement, 10 op
555375S: Lab to Market, 5 op
555376S: Sustainable organisational development, 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

Medical and Wellness Technology

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440265: Complementary Module, Medical and Wellness Technology, 20 - 30 op

Mining Technology and Mineral Processing

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op
555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Mechanical Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Software Engineering

A440266: Complementary Module, Software Engineering, 20 - 30 op
555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Process Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440249: Supplementary Module, Process Engineering, 20 - 30 op

Civil Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440263: Complementary Module, Civil Engineering, 20 - 30 op

Electrical Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Information Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

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

Environmental Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

Other engineering module

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

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

If the courses total remain under 90 ECTS cr, then degree can be completed with elective studies. The recommendation for elective studies are 555212P Orientation Course for New Students, 030008P Information Skills for Foreign Degree Students and language-, business or entrepreunership studies. For IMP's students Finnish language studies are recommended. More information can be found in WebOodi's course catalogues (example Oulu Business School and Extension School).

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op
A440269: Special Module, 0 - 10 op
Recommended studies
030008P: Information Skills for foreign degree students, 1 op
555214A: Working in the university community, 5 op
555215A: Working life project, 5 op
555310S: Demola Project, 5 op
Recommended Finnish language studies
900017Y: Survival Finnish Course, 2 op
900013Y: Beginners' Finnish Course 1, 3 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

Master of Science in Technology, Industrial Engineering and Management/ Product Management (ProM)

Tutkintorakenteen tila: published

Lukuvuosi: 2017-18

Lukuvuoden alkamispäivämäärä: 01.08.2017

MAJOR STUDIES: Common, 20 ECTS cr (vähintään 20 op)

555307M: Common Studies of the Majors in other Universities /Institutes, 0 - 30 op
A440227: Major Studies / Common Studies, Advanced Module, 20 op
Common studies
555313S: Management, 5 op
555314S: Management Information Systems, 5 op
555301S: Research Seminar, 5 op
555304S: Advanced Internship, 5 op

MAJOR STUDIES: Advanced, 20 ECTS cr (vähintään 20 op)

555308M: Advanced Studies of the Majors in other Universities /Institutes, 0 - 30 op
A440228: Major Studies / Product Management, Advanced Module, 20 op
Obligatory studies in Product Management
555350S: Research and Technology Management, 5 op
555343S: Product Data and product life cycle management, 5 op
555346S: Product portfolio management, 5 op
555351S: Advanced Course in Product Development, 5 op

SUPPLEMENTARY MODULE 1: Supplementary studies, 20 ECTS cr (vähintään 20 op)

Total extent of the major studies (common and major's compulsory) and supplementary module1 should be at least 60 ECTS cr. If the total extent is exceeded at least with 10 ECTS cr, then the special module should not be included in the study plan.

1. Select 1 - 2 of modules 11 - 13. Language of instruction in module 13 is Finnish.
2. If necessary fill the modules with elective advanced studies (list is included in modules) so that the total extent of the major studies is at least 60 ECTS cr.

Module 11: 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
Electives
555375S: Lab to Market, 5 op
555376S: Sustainable organisational development, 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
555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

Module 12: 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
Elective advanced studies
555375S: Lab to Market, 5 op
555376S: Sustainable organisational development, 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
Studies in Organisation and knowledge management
555370S: Strategic Management, 5 op
555371S: Human Resource Management, 5 op
555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

Module 13: 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
Electives
555375S: Lab to Market, 5 op
555376S: Sustainable organisational development, 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

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op
555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 op

SUPPLEMENTARY MODULE 2: Engineering and other IEM studies, 20 ECTS cr (vähintään 20 op)

Master's Programme student (2 year education) should select 'other IEM' studies.

Degree Programme student (5 year education) should select 'engineering' studies.

Other Industrial Engineering and Management Studies

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440270: Complementary Module, Other Industrial Engineering and Management Studies, 20 - 30 op
Elective intermediate studies (max 10 cr)
555226A: Operations and supply chain management, 5 op
555242A: Product development, 5 op
555285A: Project management, 5 op
555286A: Process and quality management, 5 op
Elective advanced studies
555330S: Sourcing Management, 5 op
555331S: Advanced Supply Chain Management, 5 op
555332S: Operations Research, 5 op
555333S: Production Management, 5 op
555350S: Research and Technology Management, 5 op
555351S: Advanced Course in Product Development, 5 op
555343S: Product Data and product life cycle management, 5 op
555346S: Product portfolio management, 5 op
555370S: Strategic Management, 5 op
555371S: Human Resource Management, 5 op
555391S: Advanced Course in Project Management, 5 op
555382S: Management of a project-based firm, 5 op
555390S: Statistical Process Management, 5 op
555389S: Systematic Process Improvement, 10 op
555375S: Lab to Market, 5 op
555376S: Sustainable organisational development, 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

Medical and Wellness Technology

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440265: Complementary Module, Medical and Wellness Technology, 20 - 30 op

Mining Technology and Mineral Processing

A440264: Complementary Module, Mining Technology and Mineral Processing, 20 - 30 op
555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Mechanical Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440255: Supplementary Module, Mechanical Engineering, 20 - 30 op

Software Engineering

A440266: Complementary Module, Software Engineering, 20 - 30 op
555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Process Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440249: Supplementary Module, Process Engineering, 20 - 30 op

Civil Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440263: Complementary Module, Civil Engineering, 20 - 30 op

Electrical Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440253: Supplementary Module, Electronics and Communications Engineering, 20 - 30 op

Information Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440267: Complementary Module, Information Engineering, 20 - 30 op

Environmental Engineering

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op
A440256: Supplementary Module, Environmental Engineering, 20 - 30 op

Other engineering module

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

SPECIAL MODULE or elective studies, 0 - 10 ECTS cr (enintään 10 op)

If the courses total remain under 90 ECTS cr, then degree can be completed with elective studies. The recommendation for elective studies are 555212P Orientation Course for New Students, 030008P Information Skills for Foreign Degree Students and language-, business or entrepreunership studies. For IMP's students Finnish language studies are recommended. More information can be found in WebOodi's course catalogues (example Oulu Business School and Extension School).

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op
A440269: Special Module, 0 - 10 op
- *Recommended studies*
  - 030008P: Information Skills for foreign degree students, 1 op
  - 555214A: Working in the university community, 5 op
  - 555215A: Working life project, 5 op
  - 555310S: Demola Project, 5 op
- *Recommended Finnish language studies*
  - 900017Y: Survival Finnish Course, 2 op
  - 900013Y: Beginners' Finnish Course 1, 3 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

Bachelor of Science in Technology, Industrial Engineering and Management (1st version)

Tutkintorakenteen tila: archived

Lukuvuosi: 2017-18

Lukuvuoden alkamispäivämäärä: 01.08.2017

BASIC AND INTERMEDIATE STUDIES (vähintään 120 op)

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

555207M: Basic Studies in other Universities/ Institutes, 0 - 30 op
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)
902150Y: Professional English for Technology, 2 op
902143Y: Company Presentations, 2 op
FOREIGN LANGUAGE(English 2 ECTS cr,elective)
902142Y: Business Correspondence, 2 op
902145Y: Working Life Skills, 2 op
CHOOSE ONE
901044Y: Second Official Language (Swedish), Written Skills, 1 op
901045Y: Second Official Language (Swedish), Oral Skills, 1 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
761118P: Mechanics 1, 5 op
Compulsory
761118P-01: Mechanics 1, lectures and exam, 0 op
761118P-02: Mechanics 1, lab. exercises, 0 op
761113P: Electricity and magnetism, 5 op
761310A: Wave motion and optics, 5 op
Compulsory
761310A-01: Wave motion and optics, lectures and exam, 0 op
761310A-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 supply chain management, 5 op
555264P: Managing well-being and quality of working life, 5 op
555286A: Process and quality management, 5 op
555242A: Product development, 5 op
555287A: Problem Solving in Business Cases, 5 op
555204A: Internship, 5 op
555208M: Intermediate Studies in other Universities/Institutes, 0 - 30 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. You can find the course structure diagrammes in Google Drive of IEM Study Counselling.

Medical and Wellness Technology (Biomedical Engineering)

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440146: Module Preparing for the Major, Medical and Wellness Technology, 40 op

Mining Technology and Mineral Processing

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
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
Electives
477013P: Introduction to Process and Environmental Engineering, 5 op
780120P: Basic Principles in Chemistry, 5 op
477201A: Material and Energy Balances, 5 op
477401A: Thermodynamic Equilibria, 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

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440141: Module Preparing for the Major, Mechanical Engineering, 40 op
Alternative
H440124: Module Preparing for the Major, Machinery Design, 40 op
Electives
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
Electives
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

Information and Software Engineering

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op

A440147: Module Preparing for the Major, Software Engineering, 40 op
Compulsory
H440130: Module Preparing for the Major, Software Engineering, 40 op
Electives
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
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

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440143: Module Preparing for the Major, Process Engineering, 40 op
Compulsory
H440126: Module Preparing for the Major, Process Engineering, 40 op
Electives
477013P: Introduction to Process and Environmental Engineering, 5 op
780120P: Basic Principles in Chemistry, 5 op
477201A: Material and Energy Balances, 5 op
477401A: Thermodynamic Equilibria, 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

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440142: Module Preparing for the Major, Civil Engineering, 40 op
Compulsory
H440125: Module Preparing for the Major, Civil Engineering, 40 op
Electives
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

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440149: Module Preparing for the Major, Electrical Engineering, 40 op
Compulsory
H440132: Module Preparing for the Major, Electrical Engineering, 40 op
Electives
521077P: Introduction to Electronics, 5 op
521109A: Electrical Measurement Principles, 5 op
521301A: Digital Techniques 1, 8 op
521302A: Circuit Theory 1, 5 op
031077P: Complex analysis, 5 op
521104P: Introduction to Material Physics, 5 op
521303A: Circuit Theory 2, 5 op
521287A: Introduction to Computer Systems, 5 op
521337A: Digital Filters, 5 op
521431A: Principles of Electronics Design, 5 op

Information Engineering

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440148: Module Preparing for the Major, Information Engineering, 40 op
Compulsory
H440131: Module Preparing for the Major, Information Engineering, 40 op
Compulsory
521160P: Introduction to Artificial Intelligence, 5 op
521287A: Introduction to Computer Systems, 5 op
Electives
521145A: Human-Computer Interaction, 5 op
521150A: Introduction to Internet, 5 op
521151A: Applied Computing Project I, 10 op
521157A: Introduction to Social Network Analysis, 5 op
521159P: Principles of Digital Fabrication, 5 op
521337A: Digital Filters, 5 op
521467A: Digital Image Processing, 5 op
521484A: Statistical Signal Processing, 5 op
521495A: Artificial Intelligence, 5 op
521453A: Operating Systems, 5 op
521457A: Software Engineering, 5 op
521275A: Embedded Software Project, 8 op
031023P: Mathematical Structures for Computer Science, 5 op

Environmental Engineering

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
A440144: Module Preparing for the Major, Environmental Engineering, 40 op
Compulsory
H440127: Module Preparing for the Major, Environmental Engineering, 40 op
Electives
477013P: Introduction to Process and Environmental Engineering, 5 op
780120P: Basic Principles in Chemistry, 5 op
477201A: Material and Energy Balances, 5 op
477401A: Thermodynamic Equilibria, 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

555205M: Engineering studies in other Universities/Institutes, 0 - 30 op
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.

555206M: Elective studies in other Universities/Institutes, 0 - 30 op
A440171: Optional Studies, Bachelor of Science (Industrial Engineering and Management), 0 - 20 op
IEM electives
555214A: Working in the university community, 5 op
555215A: Working life project, 5 op
555310S: Demola Project, 5 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

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

ay402961P: Basics of Anatomy and Physiology (OPEN UNI), 5 op
A440262: Complementary Study Module of the Major/ Elective studies, Advanced Module, 5 - 10 op
580102P: Introduction to Medical and Wellbeing Technology, 5 op
H440129: Module Preparing for the Major, Medical and Wellness Technology, 40 op
Electives
521242A: Introduction to Biomedical Engineering, 5 op
521109A: Electrical Measurement Principles, 5 op
764163P: Introduction to Biomedical Physics, 5 op
080925A: Anatomy and Physiology for Biomedical Engineering, 5 op
080901A: Introduction to Technology in Clinical Medicine, 5 op
761116P: Radiation physics, biology and safety, 3 op
764327A: Virtual measurement environments, 5 op
041201A: Basics in eHealth, 5 op
521302A: Circuit Theory 1, 5 op
555212P: Orientation Course for New Students, 1 op
900009P: Second Official Language (Finnish), 2 op
900082Y: Second Official Language (Finnish), Oral Skills, 1 - 3 op
900081Y: Second Official Language (Finnish), Written Skills, 1 - 2 op
901008P: Second Official Language (Swedish), 2 op
903012P: Technical German 3, 6 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

555307M: Common Studies of the Majors in other Universities /Institutes, 0 - 30 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

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

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 will be able to:

- explain the key concepts of management information systems
- understand the significance of information and information management in modern business and business process management
- define the information needs of management processes and understands how information systems can meet these needs
- recognise the current trends in management information systems technologies and practices and find out the relevant MIS information sources
- participate in enterprise information system designing, purchasing, and development tasks as a role of industrial engineer/process developer

strengthen the self-directing, reflective learning skills

Contents:

key concepts: management information systems (MIS), managerial information, different types of MIS applications, information systems in decision making and leadership, the effects of information technology in business processes and their development. Current trends in management information systems technologies and practices, business driven IT infrastructure and management, special characteristics of business development projects that contain ICT implementation.

Mode of delivery:

The tuition will be implemented as face-to-face teaching. If active participation for the course is not possible, independent learning method is offered including a case study in a student's own work organisation (independent learning method is available only for IEM students).

Learning activities and teaching methods:

Lectures 14 h / learning diary 27 hours / self-study and group work 93 h. The implementation methods of the self-study and group work vary.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent, 555313S Management.

Recommended optional programme components:

Basic understanding of some business process areas helps learning (e.g. production management, supply chain management, sales and marketing management).

Recommended or required reading:

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

Assessment methods and criteria:

This course utilises continuous assessment (e.g. a reflective learning diary returned on a weekly basis) and conducting the learning tasks. Since the implementation of self-study and group work vary, the 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:

D.Sc. Hanna Kropsu-Vehkaperä.

Working life cooperation:

The course includes the guest lectures of industry to offer various and topical views to MIS in practice.

Other information:

Substitutes the course 555344S Management Information Systems.

555301S: Research Seminar, 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 of the course, the student will be able to:

- know scientific process and different research methods
- select an appropriate method for his/her master's thesis work
- evaluate validity of research work and provide constructive criticism
- 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:

Dr Janne Harkonen

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:

English

Timing:

Periods 1 - 2, 3 - 4 and summer

Target group:

Industrial engineering and Management students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

-

Grading:

pass/ fail

Person responsible:

Lic.Sc.(Tech) Eija Forsberg

Other information:

Find the latest course information and instructions to join Edmodo in here. You can register to the course and join the classes in Edmodo even you haven't performed internship yet. You can simply read the reports uploaded by other students and ask more about their internship experiences.
Substitutes the course 555311S Advanced Internship.

555308M: Advanced Studies of the Majors in other Universities /Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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:

Upon completion of the course, the student will be able to:

- understand the overall concept of sourcing management
- know the key concepts of sourcing and purchase management and can explain these
- describe the structures of sourcing and purchasing organisations and can explain the meaning of sourcing management in the performance of operations
- analyse the purchasing activities in a company and can produce improvement proposals based on the analysis
- 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 114 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:

The group work is done in cooperation with case companies.

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 will be able to:

- define supply chain management concepts, describe supply chain structures, and explain the importance of effective supply chain management
- analyse supply chain operations and propose development areas based on the analysis
- 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. (2014) Tilaus-toimitusketjun hallinta. Jouni Sakki Oy. Other materials will be provided 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 utilises a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

Case organisations' supply chain related data is utilised in the group works.

Other information:

-

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: Osmo Kauppila, Farzad Pargar

Opintokohteen kielet: Finnish

Leikkaavuudet:

555342S Operations Research 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 4.

Learning outcomes:

Upon completion of the course, the student will be able to:

- understand the basic concepts of operations research and its applications in operations and production activities and decision-making in companies
- apply 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 96 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. Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other 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 (50%) and a compilation of analytics exercises that can be done in groups (50 %).

Grading:

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

Person responsible:

D. Sc. Farzad Pargar

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 will be able to:

- understand the key concepts of operations and production management
- know the essential production strategies
- understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analysing and constructing development plans for production organisations
- apply the management methods also in service systems
- understand 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 94 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:

The group work is done in cooperation with case companies.

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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

Electives

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 students.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

-

555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.

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

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

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:

Periods 1-2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- explain and describe the most important project management areas and tools
- identify and evaluate the most applicable managerial approaches for different types of projects
- identify development needs and opportunities in project-based organisations
- to develop project management processes in an organisation

Contents:

different type of projects and industry specific approaches to project management, agile project management, managing large international projects, project governance, project risk and uncertainty management, project time and schedule management, management of innovative projects.

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 26h, group exercises and cases 66h, self-study 42h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the 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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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:

Upon completion of the course student will be able to:

- describe the core areas of the management of the project-based firm
- explain how different internal and external contextual factors affect the business of a project-based firm, and how they should be taken account in the design of a business model
- understand the role of services in the business of a project-based firm
- apply systematic approach to project negotiation
- evaluate the significance of a single project for the business of a project based-firm

Contents:

Contextual factors in project business, business model of a project-based firm, integration of services to the business of a project-based firm, project sales and marketing, contracting, project negotiations (negotiation analytic approach) and organising support functions in project-based firm.

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 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 utilises 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:

Group work will be done for a project-based firm or public sector organisation.

Other information:

Previous course name was 'Management of a Project-based Firm'.

Elective advanced studies

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 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:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

-

555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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:

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

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS credits.
Language of instruction:
Finnish/English
Timing:
Periods 1-4 or as summer studies independently
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 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:
Adjunct professor Jukka Majava
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.

Studies in 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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

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 of the course, the student will be able to:

- analyse and improve the processes of an organisation with the help of statistical tools
- disseminate the applicability of various statistical tools and methods in different kinds of organisational 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, 106 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:

Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises. The course grade is determined by the completeness and independent thought demonstrated in the set of exercises.

Grading:

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

Person responsible:

University lecturer 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 of the course, the student will be able to:

- manage the improvement and problem solving in a process using quality management tools
- explain the steps of the DMAIC problem solving model and apply the correct tools for each step
- apply quality tools into real life process data with the help of MINITAB software and to analyse the results
- increase 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:

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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 (50 % of the course grade), take part in the course lectures and return the related exercises (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

a group exercise related to a process operating in practice.

Other information:

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Electives

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 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:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

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555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

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Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

A440270: Complementary Module, Other Industrial Engineering and Management Studies, 20 - 30 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Elective intermediate studies (max 10 cr)

555226A: Operations and supply chain management, 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 will be able to:

- describe different production types
- apply different forecasting methods, plan needed production capacity, and apply location and transportation decisions related methods
- master common inventory management methods and aggregated and short-term scheduling
- 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 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 Company presentations course simultaneously.

Recommended or required reading:

Lecture and exercise materials. Krajewski, L.J. et al. (2012) Operations management: processes and supply chains, 10th ed. Pearson. In addition, recommended material includes chapter 13 in Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The group work will be done for a real company by using public information sources.

Other information:

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

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

Ei opintojaksokuvauksia.

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 2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- describe explain the essential concepts and methods related to project management
- apply project management methods to create a schedule for a project and calculate critical path
- understand essential concepts related to project cost management and able to apply earned value method and three point estimate to manage project costs
- recognises the essential tasks of project risk management

Contents:

Defining project management, project goals and objectives, project phases and project life-cycle management, project planning, organising and scope management, schedule management, cost management, earned value calculation and project risk management, project stakeholder management, project communications management, the role of project manager, new modes of project delivery

Mode of delivery:

The tuition will be implemented as web-based teaching.

Learning activities and teaching methods:

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:

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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry

Other information:

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

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 of the course, the student will be able to:

- explain the role of process and quality management in a business organisation
- develop business processes based on the principles of quality management and appropriate tool

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

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 weekly course exercises (50 % of the course grade) and an exam (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555281A Basic Course of Quality Management.

Elective advanced studies

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:

Upon completion of the course, the student will be able to:

- understand the overall concept of sourcing management
- know the key concepts of sourcing and purchase management and can explain these
- describe the structures of sourcing and purchasing organisations and can explain the meaning of sourcing management in the performance of operations
- analyse the purchasing activities in a company and can produce improvement proposals based on the analysis
- 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 114 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:

The group work is done in cooperation with case companies.

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 will be able to:

- define supply chain management concepts, describe supply chain structures, and explain the importance of effective supply chain management
- analyse supply chain operations and propose development areas based on the analysis
- 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. (2014) Tilaus-toimitusketjun hallinta. Jouni Sakki Oy. Other materials will be provided 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 utilises a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

Case organisations' supply chain related data is utilised in the group works.

Other information:

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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: Osmo Kauppila, Farzad Pargar

Opintokohteen kielet: Finnish

Leikkaavuudet:

555342S Operations Research 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 4.

Learning outcomes:

Upon completion of the course, the student will be able to:

- understand the basic concepts of operations research and its applications in operations and production activities and decision-making in companies
- apply 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 96 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. Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other 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 (50%) and a compilation of analytics exercises that can be done in groups (50 %).

Grading:

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

Person responsible:

D. Sc. Farzad Pargar

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 will be able to:

- understand the key concepts of operations and production management
- know the essential production strategies
- understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analysing and constructing development plans for production organisations
- apply the management methods also in service systems
- understand 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 94 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:

The group work is done in cooperation with case companies.

Other information:

Substitutes course 555322S Production Management.

555350S: Research and 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:

Upon completion of the course, the student will be able to:

- understand the differences between product development and technology management in a company
- piece together the development needs and cycles of technologies in an organisation
- combine technology development and technology management with strategic planning of a company

Contents:

Defining technology and its role within an enterprise and within society, the meaning of innovation in technological competition, the lifecycles of technology including development, acquirement, and transition

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 114 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 articles.

Assessment methods and criteria:

Exam and group work.

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:

Visitor lecturers from the industry

Other information:

Previous course name was 'Technology Management'.
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 will be able to:

- understand the objectives of requirements engineering (RE), design for excellence (DfX) product design concept and delivery capability creation (DCC) in order to develop and ramp up sustainable products with minimum product specific investments
- understand requirements engineering process and its key activities, DfX product design concept as product design guidelines, targets and key performance indicators (KPIs)
- understand DCC process as a sub-process of new product development (NPD) process including key roles, tasks and milestone criteria
- analyse and further develop RM, DfX and DCC as a part of product development processes

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritisation and valuation, Design for Excellence (DfX), delivery capability creation (DCC), 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 students.

Prerequisites and co-requisites:

555242A Product development, 555350S Research and Technology management (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:

The group work will be done in cooperation with case companies.

Other information:

Substitutes course 555345S Advanced Course in Product Development.

555343S: Product Data and product life cycle management, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarises students with the broad concepts of product data management (PDM) and product life cycle management (PLM). Upon completion of the course, the student will be able to:

- understand the basic terminology related to product, productisation, PDM and PLM
- analyse the current status of the productisation, product data structures, product life cycle management, commercial and technical product portfolios and related applications in case companies
- create strategic PDM and PLM concept based on the critical building blocks for one product data, product master data and product related business data
- model the company's HW, SW and Service product related commercial and technical product portfolios according to productisation concept
- understand the PDM and PLM processes including key roles as concept owners, education and support roles, data owners, data users including product data quality concept

- create and implement the governance model for PDM and PLM process and IT development as a part of company’s business process development including PDM/PLM related information technology (IT) architecture for product master data and product related business data

Learning outcomes:

PDM and PPM strategic targets, productisation concept, commercial and technical product portfolios, PDM and PLM processes and tools, governance model and related IT applications and architecture

Contents:

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

Mode of delivery:

The tuition will be implemented as face-to-face teaching, course readings and by a practical assignment which is a common with a course 555346S Product portfolio management.

Learning activities and teaching methods:

Lectures 20 h, practical assignment (group work) and self-study 114 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555242 Product development, 555346S Product portfolio management.

Recommended optional programme components:

555351S Advanced course in product development, 555350S Research and technology management

Recommended or required reading:

Lecture materials and selected articles.

Assessment methods and criteria:

Group work report (50 % of the grade) and exam (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:

Senior research fellow Arto Tolonen.

Working life cooperation:

The group work will be done in cooperation with case companies.

Other information:

Previous course name was 'Product Data Management'.

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
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 and product portfolio management. Student knows the basic steps of the product portfolio management development and understands the ways to analyse and manage products and product portfolios. A student learns to see product and product portfolio management as strategic targets, performance indicators, governance models, process and product information management over horizontal and technical portfolios over product life cycle phases and product structure levels. The student can apply the learned things and methods in different industries in order to develop systematic product and product portfolio management processes.

Contents:

Basic issues in product and product portfolio management performance management, governance models, horizontal and vertical portfolios, processes, tools and product information.

Mode of delivery:

The tuition will be implemented as face-to-face learning and practical assignments.

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:

Dr Arto Tolonen.

Working life cooperation:

No.

Other information:

Course name from 1.8.2017 is 'Product Portfolio 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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

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:

Periods 1-2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- explain and describe the most important project management areas and tools
- identify and evaluate the most applicable managerial approaches for different types of projects
- identify development needs and opportunities in project-based organisations
- to develop project management processes in an organisation

Contents:

different type of projects and industry specific approaches to project management, agile project management, managing large international projects, project governance, project risk and uncertainty management, project time and schedule management, management of innovative projects.

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 26h, group exercises and cases 66h, self-study 42h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the 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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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:

Upon completion of the course student will be able to:

- describe the core areas of the management of the project-based firm
- explain how different internal and external contextual factors affect the business of a project-based firm, and how they should be taken account in the design of a business model
- understand the role of services in the business of a project-based firm
- apply systematic approach to project negotiation
- evaluate the significance of a single project for the business of a project based-firm

Contents:

Contextual factors in project business, business model of a project-based firm, integration of services to the business of a project-based firm, project sales and marketing, contracting, project negotiations (negotiation analytic approach) and organising support functions in project-based firm.

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 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 utilises 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:

Group work will be done for a project-based firm or public sector organisation.

Other information:

Previous course name was 'Management of a Project-based Firm'.

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 of the course, the student will be able to:

- analyse and improve the processes of an organisation with the help of statistical tools
- disseminate the applicability of various statistical tools and methods in different kinds of organisational 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, 106 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:

Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises. The course grade is determined by the completeness and independent thought demonstrated in the set of exercises.

Grading:

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

Person responsible:

University lecturer 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 of the course, the student will be able to:

- manage the improvement and problem solving in a process using quality management tools
- explain the steps of the DMAIC problem solving model and apply the correct tools for each step
- apply quality tools into real life process data with the help of MINITAB software and to analyse the results
- increase 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:

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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 (50 % of the course grade), take part in the course lectures and return the related exercises (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

a group exercise related to a process operating in practice.

Other information:

-

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 students.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

-

555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

A440265: Complementary Module, Medical and Wellness Technology, 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.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

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

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

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

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
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.

Recommended studies

030008P: Information Skills for foreign degree students, 1 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Faculty of Technology
Arvostelu: 1 - 5, pass, fail
Opettajat: Ursula Heinikoski, Sassali, Jani Henrik
Opintokohteen kielet: English

ECTS Credits:

1 ECTS credits / 27 hours of work

Language of instruction:

English

Timing:

1st year of Master’s Degree Programme in Environmental Engineering (EE) and in Industrial Engineering and Management (international students). The course is held once in the autumn semester, during period II and in the spring semester, during period IV.

Learning outcomes:

Upon completion of the course, the students:
- can search scientific information for their thesis,
- know how to evaluate search results and information sources,
- understands the principles of scientific publishing,
- can use the reference management tool.

Contents:

Scientific information retrieval and the search terms, the most important databases and publication channels of the discipline, tools for evaluating the quality of scientific information and RefWorks reference management tool.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

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

Target group:

The course is compulsory for the Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (international students). Optional for other degree students working on their diploma/master's thesis.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Web learning material: http://libguides.oulu.fi/findinginformation

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

Pass/fail

Person responsible:

Ursula Heinikoski

Working life cooperation:

-

Other information:

-

555214A: Working in the university community, 5 op

Voimassaolo: 01.01.2017 -
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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the university community (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support the university community and their own professional growth.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

The course can include several tasks as follows: Student Union 2 years 2 ECTS, University Board 1 year 2 ECTS, University Collegial Body 2 years 2 ECTS, Education Council 1 year 2 ECTS, Education Management Team 1 year 2 years, Faculty Management Team 1 year 2 ECTS, Faculty Board 2 years 2 ECTS, Faculty Education Council 2 years 2op, Student Union Board 1 year 1-3 ECTS, National Student Organisation 1 year 1-5 ECTS, Other major education policy and / or teaching development tasks 1-3 ECTS credits, Student Tutor or Teaching Assistant 2 ECTS cr.
The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555215A: Working life project, 5 op

Voimassaolo: 01.01.2017 -

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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the working life (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support their own professional growth.

Target group:

Industrial Engineering and Management students

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Participation in a company project, competition or similar (e.g. Accenture innovation challenge, ESTIEM Times). The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555310S: Demola Project, 5 op

Voimassaolo: 01.01.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Simo-Pekka Kekäläinen

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Fall and Spring

Learning outcomes:

Upon completion of the course, the student is able to apply and use the core competencies of his/ her studies in a real life problem solving context. The student will learn skills that will allow him/ her to participate in a professional role in a project team that uses lean development methods to validate ideas and to create a demo or a prototype of a product, service, or other innovation. The course provides the student with experience in project work and improves the student´s team working skills as the course assignments are carried out by a multidisciplinary and international teams comprising of students with different backgrounds and skill sets. The course will also improve student´s communication and oral presentation skills as the student will need to summarize, rationalize, and present findings and ideas throughout the project.

Contents:

The entrepreneurial field project is organized within the international Demola network and the project comprises facilitated and supported real-life problem definition, data collection, problem solving, implementation and communication.

Mode of delivery:

Facilitated and supported project. Demola projects will be arranged two times per year; one season in the springtime (starting from January/February) and one in the autumn (starting from August/September). Dates can be checked from Weboodi.

Learning activities and teaching methods:

Learning takes place during the project as team learning and problem solving, with feedback from the responsible teachers and problem owning company or organization.

Target group:

Open to all. Students have to submit their application to Demola facilitators at oulu.demola.net when the season starts (either in January or August).

Prerequisites and co-requisites:

It is recommended that before starting Demola, the student has acquired some theoretical knowledge through his/her degree studies. Otherwise, there are no prerequisite knowledge requirements.

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:

Materials vary according to the assignment.

Assessment methods and criteria:

Active participation in the entire process, delivery of the required documents, presentations and a demo or a prototype.

Grading:

The course utilizes verbal grading scale “pass/fail”

Person responsible:

Simo Kekäläinen

Working life cooperation:

A group of students will carry out a development project to create a solution for the company’s genuine and existing challenges. The project team reports to a supervising teacher and a company representative(s).

Other information:

The number of students is restricted.

Recommended Finnish language studies

900017Y: Survival Finnish Course, 2 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900017Y Survival Finnish Course (OPEN UNI) 2.0 op

Proficiency level:

A1.1

Status:

The course is intended for the international students in every faculty of Oulu University.

Required proficiency level:

No previous Finnish studies.

ECTS Credits:

2 ECTS credits

Language of instruction:

Finnish and English

Timing:

-

Learning outcomes:

By the end of the course the student can understand and use some very common everyday expressions and phrases, and s/he can locate informational content in simple texts and messages. The student also knows the basic characteristics of Finnish language and Finnish communication styles.

Contents:

This is an introductory course which aims to help students to cope with the most common everyday situations in Finnish. During the course, students learn some useful everyday phrases, some general features of the vocabulary and grammar, and the main principles of pronunciation.

The topics and communicative situations covered in the course are: general information about the Finnish language, some politeness phrases (how to greet people, thank and apologize), introducing oneself, giving and asking for basic personal information, numbers, some time expressions (how to tell and ask the time, days of the week, time of day), food, drink and asking about prices.

The structures studied are: personal pronouns and their possessive forms, forming affirmative, negative and interrogative sentences, the conjugation of some verbs, the basics of the partitive singular and some local cases for answering the ‘where'-question.

Mode of delivery:

Multi-modal teaching (Contact teaching, on-line teaching and independent work)

Learning activities and teaching methods:

Lessons 1–2 times a week (12–14 h) and guided self study (36 h)

Target group:

International degree and post-graduate degree students and exchange students of the University

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Will be provided during the course.

Assessment methods and criteria:

Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grading scale is 1-5.

Person responsible:

Anne Koskela

Working life cooperation:

-

Other information:

Sign-up in WebOodi.

900013Y: Beginners' Finnish Course 1, 3 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900013Y	Beginners' Finnish Course 1 (OPEN UNI)	2.0 op

Proficiency level:

A1.2

Status:

The course is intended for the international students in every faculty of Oulu University.

Required proficiency level:

A1.1, Completion of the Survival Finnish course (900017Y) or the equivalent language skills.

ECTS Credits:

3 ECTS credits

Language of instruction:

As much Finnish as possible; English will be used as a help language.

Timing:

-

Learning outcomes:

By the end of the course the student can understand and use some familiar and common everyday expressions relating to her/himself and everyday situations. S/he can interact in a simple way provided the other person talks slowly and clearly and is willing to help. The student is able to read short simple texts and messages dealing with familiar topics. S/he also deepens her/his understanding of the Finnish language and communication styles.

Contents:

This is lower elementary course which aims to help students to learn communication skills in ordinary everyday situations. During the course, students broaden their vocabulary and knowledge of grammar and principles of pronunciation. They also practise to understand easy Finnish talk about everyday subjects, and reading and writing short and simple texts/messages.

The topics and communicative situations covered in the course are: talking about oneself, one's family, studies and daily routines, as well as asking about these things from other person, expressing opinions,

describing people and things, talking about weather and seasons, the names of the months and colours.

The structures studied are: verb types, basics of the change of the consonants k, p and t in verbs and nouns, the genitive and partitive cases, possessive structure, some declension types for nouns (word types) and the basics of the local cases.

Mode of delivery:

Contact teaching and guided self study

Learning activities and teaching methods:

Lessons 2 times a week (26 h) and guided self study (50 h)

Target group:

International degree and post-graduate degree students and exchange students of the University

Prerequisites and co-requisites:

Completion of the Survival Finnish Course

Recommended optional programme components:

-

Recommended or required reading:

Gehring, S. & Heinzmann, S. Suomen mestari 1 (chapters 3 - 5)

Assessment methods and criteria:

Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grading scale is 1-5.

Person responsible:

Anne Koskela

Working life cooperation:

-

Other information:

Sign-up in WebOodi. The course will start right after the Survival Finnish course.

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 will be able to:

- solve challenging problems in organisations independently
- create a research plan, and define a research problem and research questions
- manage his own work according to the research plan

- utilise different information sources and critically evaluate the information obtained
- 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 is typically an empirical or a theoretical study.
Target group:
Industrial Engineering and Management students.
Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent. Courses that support the topic of the thesis.
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:
The course utilises a numerical grading scale 1-5. In the numerical scale zero stands for a fail. The thesis is assessed by using the thesis assessment form http://www.oulu.fi/sites/default/files/content/Dtyon_arviointi_English14.pdf
Person responsible:
Adjunct professor Jukka Majava
Working life cooperation:
The thesis is typically done for a private or public sector organisation.
Other information:
Instructions and forms related to Master's Thesis can found in here.
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

555307M: Common Studies of the Majors in other Universities /Institutes, 0 - 30 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

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

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 will be able to:

- explain the key concepts of management information systems
- understand the significance of information and information management in modern business and business process management
- define the information needs of management processes and understands how information systems can meet these needs
- recognise the current trends in management information systems technologies and practices and find out the relevant MIS information sources
- participate in enterprise information system designing, purchasing, and development tasks as a role of industrial engineer/process developer

strengthen the self-directing, reflective learning skills

Contents:

key concepts: management information systems (MIS), managerial information, different types of MIS applications, information systems in decision making and leadership, the effects of information technology

in business processes and their development. Current trends in management information systems technologies and practices, business driven IT infrastructure and management, special characteristics of business development projects that contain ICT implementation.

Mode of delivery:

The tuition will be implemented as face-to-face teaching. If active participation for the course is not possible, independent learning method is offered including a case study in a student's own work organisation (independent learning method is available only for IEM students).

Learning activities and teaching methods:

Lectures 14 h / learning diary 27 hours / self-study and group work 93 h. The implementation methods of the self-study and group work vary.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

B.Sc. in Industrial Engineering and Management or equivalent, 555313S Management.

Recommended optional programme components:

Basic understanding of some business process areas helps learning (e.g. production management, supply chain management, sales and marketing management).

Recommended or required reading:

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

Assessment methods and criteria:

This course utilises continuous assessment (e.g. a reflective learning diary returned on a weekly basis) and conducting the learning tasks. Since the implementation of self-study and group work vary, the 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:

D.Sc. Hanna Kropsu-Vehkaperä.

Working life cooperation:

The course includes the guest lectures of industry to offer various and topical views to MIS in practice.

Other information:

Substitutes the course 555344S Management Information Systems.

555301S: Research Seminar, 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 of the course, the student will be able to:

- know scientific process and different research methods
- select an appropriate method for his/her master's thesis work
- evaluate validity of research work and provide constructive criticism

- 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:

Dr Janne Harkonen

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:

English

Timing:

Periods 1 - 2, 3 - 4 and summer

Target group:

Industrial engineering and Management students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

-

Grading:

pass/ fail

Person responsible:

Lic.Sc.(Tech) Eija Forsberg

Other information:

Find the latest course information and instructions to join Edmodo in here. You can register to the course and join the classes in Edmodo even you haven't performed internship yet. You can simply read the reports uploaded by other students and ask more about their internship experiences.
Substitutes the course 555311S Advanced Internship.

555308M: Advanced Studies of the Majors in other Universities /Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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: Research and 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:

Upon completion of the course, the student will be able to:

- understand the differences between product development and technology management in a company
- piece together the development needs and cycles of technologies in an organisation
- combine technology development and technology management with strategic planning of a company

Contents:

Defining technology and its role within an enterprise and within society, the meaning of innovation in technological competition, the lifecycles of technology including development, acquirement, and transition

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 114 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 articles.

Assessment methods and criteria:

Exam and group work.

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:

Visitor lecturers from the industry

Other information:

Previous course name was 'Technology Management'.
Substitutes course 555340S Technology Management.

555343S: Product Data and product life cycle management, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarises students with the broad concepts of product data management (PDM) and product life cycle management (PLM). Upon completion of the course, the student will be able to:

- understand the basic terminology related to product, productisation, PDM and PLM
- analyse the current status of the productisation, product data structures, product life cycle management, commercial and technical product portfolios and related applications in case companies
- create strategic PDM and PLM concept based on the critical building blocks for one product data, product master data and product related business data
- model the company's HW, SW and Service product related commercial and technical product portfolios according to productisation concept
- understand the PDM and PLM processes including key roles as concept owners, education and support roles, data owners, data users including product data quality concept
- create and implement the governance model for PDM and PLM process and IT development as a part of company's business process development including PDM/PLM related information technology (IT) architecture for product master data and product related business data

Learning outcomes:

PDM and PPM strategic targets, productisation concept, commercial and technical product portfolios, PDM and PLM processes and tools, governance model and related IT applications and architecture

Contents:

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

Mode of delivery:

The tuition will be implemented as face-to-face teaching, course readings and by a practical assignment which is a common with a course 555346S Product portfolio management.

Learning activities and teaching methods:

Lectures 20 h, practical assignment (group work) and self-study 114 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555242 Product development, 555346S Product portfolio management.

Recommended optional programme components:

555351S Advanced course in product development, 555350S Research and technology management

Recommended or required reading:

Lecture materials and selected articles.

Assessment methods and criteria:

Group work report (50 % of the grade) and exam (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:

Senior research fellow Arto Tolonen.

Working life cooperation:

The group work will be done in cooperation with case companies.

Other information:

Previous course name was 'Product Data Management'.

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
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 and product portfolio management. Student knows the basic steps of the product portfolio management development and understands the ways to analyse and manage products and product portfolios. A student learns to see product and product portfolio management as strategic targets, performance indicators, governance models, process and product information management over horizontal and technical portfolios over product life cycle phases and product structure levels. The student can apply the learned things and methods in different industries in order to develop systematic product and product portfolio management processes.

Contents:

Basic issues in product and product portfolio management performance management, governance models, horizontal and vertical portfolios, processes, tools and product information.

Mode of delivery:

The tuition will be implemented as face-to-face learning and practical assignments.

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:

Dr Arto Tolonen.

Working life cooperation:

No.

Other information:

Course name from 1.8.2017 is 'Product Portfolio 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 will be able to:

- understand the objectives of requirements engineering (RE), design for excellence (DfX) product design concept and delivery capability creation (DCC) in order to develop and ramp up sustainable products with minimum product specific investments
- understand requirements engineering process and its key activities, DfX product design concept as product design guidelines, targets and key performance indicators (KPIs)
- understand DCC process as a sub-process of new product development (NPD) process including key roles, tasks and milestone criteria
- analyse and further develop RM, DfX and DCC as a part of product development processes

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritisation and valuation, Design for Excellence (DfX), delivery capability creation (DCC), 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 students.

Prerequisites and co-requisites:

555242A Product development, 555350S Research and Technology management (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:

The group work will be done in cooperation with case companies.

Other information:

Substitutes course 555345S Advanced Course in Product Development.

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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

Electives

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 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:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

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555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

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:

Periods 1-2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- explain and describe the most important project management areas and tools
- identify and evaluate the most applicable managerial approaches for different types of projects
- identify development needs and opportunities in project-based organisations
- to develop project management processes in an organisation

Contents:

different type of projects and industry specific approaches to project management, agile project management, managing large international projects, project governance, project risk and uncertainty management, project time and schedule management, management of innovative projects.

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 26h, group exercises and cases 66h, self-study 42h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the 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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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:

Upon completion of the course student will be able to:

- describe the core areas of the management of the project-based firm
- explain how different internal and external contextual factors affect the business of a project-based firm, and how they should be taken account in the design of a business model
- understand the role of services in the business of a project-based firm
- apply systematic approach to project negotiation
- evaluate the significance of a single project for the business of a project based-firm

Contents:

Contextual factors in project business, business model of a project-based firm, integration of services to the business of a project-based firm, project sales and marketing, contracting, project negotiations (negotiation analytic approach) and organising support functions in project-based firm.

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 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 utilises 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:

Group work will be done for a project-based firm or public sector organisation.

Other information:

Previous course name was 'Management of a Project-based Firm'.

Elective advanced studies

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 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:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

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555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops.

Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

Studies in 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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

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 of the course, the student will be able to:

- analyse and improve the processes of an organisation with the help of statistical tools
- disseminate the applicability of various statistical tools and methods in different kinds of organisational 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, 106 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:

Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises. The course grade is determined by the completeness and independent thought demonstrated in the set of exercises.

Grading:

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

Person responsible:

University lecturer 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 of the course, the student will be able to:

- manage the improvement and problem solving in a process using quality management tools
- explain the steps of the DMAIC problem solving model and apply the correct tools for each step
- apply quality tools into real life process data with the help of MINITAB software and to analyse the results
- increase 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 (50 % of the course grade), take part in the course lectures and return the related exercises (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

a group exercise related to a process operating in practice.

Other information:

-

Electives

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis

- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 students.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

-

555376S: Sustainable 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
Opettajat: Arto Reiman
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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555309M: Supplementary Studies of the Majors in other Universities /Institutes, 0 - 60 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
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

A440270: Complementary Module, Other Industrial Engineering and Management Studies, 20 - 30 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Supplementary Module
Laji: Study module
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

Elective intermediate studies (max 10 cr)

555226A: Operations and supply chain management, 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 will be able to:

- describe different production types
- apply different forecasting methods, plan needed production capacity, and apply location and transportation decisions related methods
- master common inventory management methods and aggregated and short-term scheduling
- 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 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 Company presentations course simultaneously.

Recommended or required reading:

Lecture and exercise materials. Krajewski, L.J. et al. (2012) Operations management: processes and supply chains, 10th ed. Pearson. In addition, recommended material includes chapter 13 in Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The group work will be done for a real company by using public information sources.

Other information:

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

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

Ei opintojaksokuvauksia.

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 2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- describe explain the essential concepts and methods related to project management
- apply project management methods to create a schedule for a project and calculate critical path
- understand essential concepts related to project cost management and able to apply earned value method and three point estimate to manage project costs
- recognises the essential tasks of project risk management

Contents:

Defining project management, project goals and objectives, project phases and project life-cycle management, project planning, organising and scope management, schedule management, cost management, earned value calculation and project risk management, project stakeholder management, project communications management, the role of project manager, new modes of project delivery

Mode of delivery:

The tuition will be implemented as web-based teaching.

Learning activities and teaching methods:

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:

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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry

Other information:

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

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 of the course, the student will be able to:

- explain the role of process and quality management in a business organisation
- develop business processes based on the principles of quality management and appropriate tool

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

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 weekly course exercises (50 % of the course grade) and an exam (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555281A Basic Course of Quality Management.

Elective advanced studies

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:

Upon completion of the course, the student will be able to:

- understand the overall concept of sourcing management
- know the key concepts of sourcing and purchase management and can explain these
- describe the structures of sourcing and purchasing organisations and can explain the meaning of sourcing management in the performance of operations
- analyse the purchasing activities in a company and can produce improvement proposals based on the analysis
- 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 114 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:

The group work is done in cooperation with case companies.

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 will be able to:

- define supply chain management concepts, describe supply chain structures, and explain the importance of effective supply chain management
- analyse supply chain operations and propose development areas based on the analysis
- 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. (2014) Tilaus-toimitusketjun hallinta. Jouni Sakki Oy. Other materials will be provided 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 utilises a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

Case organisations' supply chain related data is utilised in the group works.

Other information:

-

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: Osmo Kauppila, Farzad Pargar

Opintokohteen kielet: Finnish

Leikkaavuudet:

555342S Operations Research 5.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

English

Timing:

Period 4.

Learning outcomes:

Upon completion of the course, the student will be able to:

- understand the basic concepts of operations research and its applications in operations and production activities and decision-making in companies
- apply 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 96 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. Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other 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 (50%) and a compilation of analytics exercises that can be done in groups (50 %).

Grading:

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

Person responsible:

D. Sc. Farzad Pargar

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 will be able to:

- understand the key concepts of operations and production management
- know the essential production strategies
- understand the principles of the supply chain management, and should be able to apply JIT, Lean and TOC methods in analysing and constructing development plans for production organisations
- apply the management methods also in service systems
- understand 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 94 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:

The group work is done in cooperation with case companies.

Other information:

Substitutes course 555322S Production Management.

555350S: Research and 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:

Upon completion of the course, the student will be able to:

- understand the differences between product development and technology management in a company
- piece together the development needs and cycles of technologies in an organisation
- combine technology development and technology management with strategic planning of a company

Contents:

Defining technology and its role within an enterprise and within society, the meaning of innovation in technological competition, the lifecycles of technology including development, acquirement, and transition

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 114 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 articles.

Assessment methods and criteria:

Exam and group work.

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:

Visitor lecturers from the industry

Other information:

Previous course name was 'Technology Management'.
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 will be able to:

- understand the objectives of requirements engineering (RE), design for excellence (DfX) product design concept and delivery capability creation (DCC) in order to develop and ramp up sustainable products with minimum product specific investments
- understand requirements engineering process and its key activities, DfX product design concept as product design guidelines, targets and key performance indicators (KPIs)
- understand DCC process as a sub-process of new product development (NPD) process including key roles, tasks and milestone criteria
- analyse and further develop RM, DfX and DCC as a part of product development processes

Contents:

The concepts of requirements management, requirements engineering process, requirement prioritisation and valuation, Design for Excellence (DfX), delivery capability creation (DCC), 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 students.

Prerequisites and co-requisites:

555242A Product development, 555350S Research and Technology management (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:

The group work will be done in cooperation with case companies.

Other information:

Substitutes course 555345S Advanced Course in Product Development.

555343S: Product Data and product life cycle management, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

Status:

5 ECTS credits.

ECTS Credits:

English.

Language of instruction:

Period 3-4.

Timing:

The course familiarises students with the broad concepts of product data management (PDM) and product life cycle management (PLM). Upon completion of the course, the student will be able to:

- understand the basic terminology related to product, productisation, PDM and PLM
- analyse the current status of the productisation, product data structures, product life cycle management, commercial and technical product portfolios and related applications in case companies
- create strategic PDM and PLM concept based on the critical building blocks for one product data, product master data and product related business data
- model the company's HW, SW and Service product related commercial and technical product portfolios according to productisation concept
- understand the PDM and PLM processes including key roles as concept owners, education and support roles, data owners, data users including product data quality concept
- create and implement the governance model for PDM and PLM process and IT development as a part of company's business process development including PDM/PLM related information technology (IT) architecture for product master data and product related business data

Learning outcomes:

PDM and PPM strategic targets, productisation concept, commercial and technical product portfolios, PDM and PLM processes and tools, governance model and related IT applications and architecture

Contents:

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

Mode of delivery:

The tuition will be implemented as face-to-face teaching, course readings and by a practical assignment which is a common with a course 555346S Product portfolio management.

Learning activities and teaching methods:

Lectures 20 h, practical assignment (group work) and self-study 114 h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555242 Product development, 555346S Product portfolio management.

Recommended optional programme components:

555351S Advanced course in product development, 555350S Research and technology management

Recommended or required reading:

Lecture materials and selected articles.

Assessment methods and criteria:

Group work report (50 % of the grade) and exam (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:

Senior research fellow Arto Tolonen.

Working life cooperation:

The group work will be done in cooperation with case companies.

Other information:

Previous course name was 'Product Data Management'.

555346S: Product portfolio management, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
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 and product portfolio management. Student knows the basic steps of the product portfolio management development and understands the ways to analyse and manage products and product portfolios. A student learns to see product and product portfolio management as strategic targets, performance indicators, governance models, process and product information management over horizontal and technical portfolios over product life cycle phases and product structure levels. The student can apply the learned things and methods in different industries in order to develop systematic product and product portfolio management processes.

Contents:
Basic issues in product and product portfolio management performance management, governance models, horizontal and vertical portfolios, processes, tools and product information.

Mode of delivery:
The tuition will be implemented as face-to-face learning and practical assignments.

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:

Dr Arto Tolonen.

Working life cooperation:

No.

Other information:

Course name from 1.8.2017 is 'Product Portfolio 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 3.

Learning outcomes:

Upon completion of the course, the student will be able to:

- utilise strategic thinking, planning, and management
- analyse and plan complex global business operations
- participate in strategic planning and strategy implementation in organisations
- apply strategy analysis frameworks and analyse 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.

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 utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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

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:

Periods 1-2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- explain and describe the most important project management areas and tools
- identify and evaluate the most applicable managerial approaches for different types of projects
- identify development needs and opportunities in project-based organisations
- to develop project management processes in an organisation

Contents:

different type of projects and industry specific approaches to project management, agile project management, managing large international projects, project governance, project risk and uncertainty management, project time and schedule management, management of innovative projects.

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 26h, group exercises and cases 66h, self-study 42h.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555285A Basic course in project management.

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials and reading materials (articles, book chapters) related to each lecture.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the 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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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:

Upon completion of the course student will be able to:

- describe the core areas of the management of the project-based firm
- explain how different internal and external contextual factors affect the business of a project-based firm, and how they should be taken account in the design of a business model
- understand the role of services in the business of a project-based firm
- apply systematic approach to project negotiation
- evaluate the significance of a single project for the business of a project based-firm

Contents:

Contextual factors in project business, business model of a project-based firm, integration of services to the business of a project-based firm, project sales and marketing, contracting, project negotiations (negotiation analytic approach) and organising support functions in project-based firm.

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 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 utilises 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:

Group work will be done for a project-based firm or public sector organisation.

Other information:

Previous course name was 'Management of a Project-based Firm'.

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 of the course, the student will be able to:

- analyse and improve the processes of an organisation with the help of statistical tools
- disseminate the applicability of various statistical tools and methods in different kinds of organisational 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, 106 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:

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Recommended or required reading:

Foreman, J. (2014) Data smart: using data science to transform information into insight. Wiley & Sons: Indianapolis. Other material handed out during the course.

Assessment methods and criteria:

To pass the course, the student must complete the course exercises. The course grade is determined by the completeness and independent thought demonstrated in the set of exercises.

Grading:

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

Person responsible:

University lecturer 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 of the course, the student will be able to:

- manage the improvement and problem solving in a process using quality management tools
- explain the steps of the DMAIC problem solving model and apply the correct tools for each step
- apply quality tools into real life process data with the help of MINITAB software and to analyse the results
- increase 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 (50 % of the course grade), take part in the course lectures and return the related exercises (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

a group exercise related to a process operating in practice.

Other information:

-

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 will be able to:

- analyse an industry to identify viable business ideas and opportunities
- use different frameworks including scenario planning, customer and user needs analysis, and technology evolution analysis
- apply frameworks and methods to distinguish interesting and promising ideas from viable opportunities, utilise frameworks and methods to evolve the ideas into viable products and businesses, and determine what business models are most effective
- present and defend own ideas, and critically examine and discuss the recommendations of others

Contents:

Industry analysis, scenario planning, customer and 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 students.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Lecture materials, articles and case materials that will be provided at the beginning of the course.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The students will pitch their idea to a jury that includes working life representation.

Other information:

-

555376S: Sustainable 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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- explain the general models regarding sustainable organisational development
- adapt the most central ones to the work organisations
- choose the most suitable models for different situations and can interpret the results gained from different approaches
- explain the most important quantitative and qualitative variables that are either preconditions or results of the operation of the organisation
- identify development needs and opportunities in companies and other organisations.

Contents:

The development of organisation is examined through e.g. the following concepts: productivity, well-being at work, quality control, quality of working life, safety and security, and responsibility. Various concepts and indicators 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 organisation.

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 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:

555371S 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 utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 30 %) and examination (weight 50 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

-

Other information:

Course's old name Organisational Development.
Substitutes course 555360S Administration, Organization and Education in Working Life.

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:

Upon completion of the course, the student will be able to:
• explain the key concepts of enterprise risk management and uncertainty management
• explain the role of risk management in organisations and compare the specific features of risk management in different organisational contexts
• identify and classify risks and conduct systematic risk analyses in organisations
• make informed improvement suggestions related to enterprise risk management in or-ganisations
• to develop enterprise risk management processes in organisations

Contents:

Definitions of risk and uncertainty, risk management standards, risk classification models, sys-tematic risk management process, methods of risk management, psychological aspects of risk management, ERM and organising of risk management, risk management in different contexts, risk governance.

Mode of delivery:

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

Learning activities and teaching methods:

Lectures 26h, self-study 42h, group assignment and cases 66h.

Target group:

Industrial Engineering and Management.

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 ma-terials will be defined at the beginning of the course.

Assessment methods and criteria:

This course utilises continuous assessment. The grading is based on case assignments solved in groups and discussed during the lecture, and group assignment that is presented and discussed in the workshops. Since the implementation of the cases and group work vary, the assessment meth-ods 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:

Assistant Professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry.

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 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 Technology Management 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish/English

Timing:

Periods 1-4 or as summer studies independently

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 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:

Adjunct professor Jukka Majava

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

A440265: Complementary Module, Medical and Wellness Technology, 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.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

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

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

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

Ei opintojaksokuvauksia.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

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.

555305M: Advanced Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

555306M: Elective Studies in other Universities /Institutes, 0 - 30 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
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.

Recommended studies

030008P: Information Skills for foreign degree students, 1 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Faculty of Technology
Arvostelu: 1 - 5, pass, fail
Opettajat: Ursula Heinikoski, Sassali, Jani Henrik
Opintokohteen kielet: English

ECTS Credits:
1 ECTS credits / 27 hours of work

Language of instruction:

English

Timing:

1st year of Master's Degree Programme in Environmental Engineering (EE) and in Industrial Engineering and Management (international students). The course is held once in the autumn semester, during period II and in the spring semester, during period IV.

Learning outcomes:

Upon completion of the course, the students:
- can search scientific information for their thesis,
- know how to evaluate search results and information sources,
- understands the principles of scientific publishing,
- can use the reference management tool.

Contents:

Scientific information retrieval and the search terms, the most important databases and publication channels of the discipline, tools for evaluating the quality of scientific information and RefWorks reference management tool.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

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

Target group:

The course is compulsory for the Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (international students). Optional for other degree students working on their diploma/master's thesis.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Web learning material: http://libguides.oulu.fi/findinginformation

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

Pass/fail

Person responsible:

Ursula Heinikoski

Working life cooperation:

-

Other information:

-

555214A: Working in the university community, 5 op

Voimassaolo: 01.01.2017 -

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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the university community (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support the university community and their own professional growth.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

The course can include several tasks as follows: Student Union 2 years 2 ECTS, University Board 1 year 2 ECTS, University Collegial Body 2 years 2 ECTS, Education Council 1 year 2 ECTS, Education Management Team 1 year 2 years, Faculty Management Team 1 year 2 ECTS, Faculty Board 2 years 2 ECTS, Faculty Education Council 2 years 2op, Student Union Board 1 year 1-3 ECTS, National Student Organisation 1 year 1-5 ECTS, Other major education policy and / or teaching development tasks 1-3 ECTS credits, Student Tutor or Teaching Assistant 2 ECTS cr.
The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555215A: Working life project, 5 op

Voimassaolo: 01.01.2017 -

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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the working life (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support their own professional growth.

Target group:

Industrial Engineering and Management students

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Participation in a company project, competition or similar (e.g. Accenture innovation challenge, ESTIEM Times). The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a

certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555310S: Demola Project, 5 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Simo-Pekka Kekäläinen
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Fall and Spring

Learning outcomes:

Upon completion of the course, the student is able to apply and use the core competencies of his/ her studies in a real life problem solving context. The student will learn skills that will allow him/ her to participate in a professional role in a project team that uses lean development methods to validate ideas and to create a demo or a prototype of a product, service, or other innovation. The course provides the student with experience in project work and improves the student´s team working skills as the course assignments are carried out by a multidisciplinary and international teams comprising of students with different backgrounds and skill sets. The course will also improve student´s communication and oral presentation skills as the student will need to summarize, rationalize, and present findings and ideas throughout the project.

Contents:

The entrepreneurial field project is organized within the international Demola network and the project comprises facilitated and supported real-life problem definition, data collection, problem solving, implementation and communication.

Mode of delivery:

Facilitated and supported project. Demola projects will be arranged two times per year; one season in the springtime (starting from January/February) and one in the autumn (starting from August/September). Dates can be checked from Weboodi.

Learning activities and teaching methods:

Learning takes place during the project as team learning and problem solving, with feedback from the responsible teachers and problem owning company or organization.

Target group:

Open to all. Students have to submit their application to Demola facilitators at oulu.demola.net when the season starts (either in January or August).

Prerequisites and co-requisites:

It is recommended that before starting Demola, the student has acquired some theoretical knowledge through his/her degree studies. Otherwise, there are no prerequisite knowledge requirements.

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:

Materials vary according to the assignment.

Assessment methods and criteria:

Active participation in the entire process, delivery of the required documents, presentations and a demo or a prototype.

Grading:

The course utilizes verbal grading scale “pass/fail”

Person responsible:

Simo Kekäläinen

Working life cooperation:

A group of students will carry out a development project to create a solution for the company’s genuine and existing challenges. The project team reports to a supervising teacher and a company representative(s).

Other information:

The number of students is restricted.

Recommended Finnish language studies

900017Y: Survival Finnish Course, 2 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900017Y	Survival Finnish Course (OPEN UNI)	2.0 op

Proficiency level:

A1.1

Status:

The course is intended for the international students in every faculty of Oulu University.

Required proficiency level:

No previous Finnish studies.

ECTS Credits:

2 ECTS credits

Language of instruction:

Finnish and English

Timing:

-

Learning outcomes:

By the end of the course the student can understand and use some very common everyday expressions and phrases, and s/he can locate informational content in simple texts and messages. The student also knows the basic characteristics of Finnish language and Finnish communication styles.

Contents:

This is an introductory course which aims to help students to cope with the most common everyday situations in Finnish. During the course, students learn some useful everyday phrases, some general

features of the vocabulary and grammar, and the main principles of pronunciation.

The topics and communicative situations covered in the course are: general information about the Finnish language, some politeness phrases (how to greet people, thank and apologize), introducing oneself, giving and asking for basic personal information, numbers, some time expressions (how to tell and ask the time, days of the week, time of day), food, drink and asking about prices.

The structures studied are: personal pronouns and their possessive forms, forming affirmative, negative and interrogative sentences, the conjugation of some verbs, the basics of the partitive singular and some local cases for answering the ‘where'-question.

Mode of delivery:

Multi-modal teaching (Contact teaching, on-line teaching and independent work)

Learning activities and teaching methods:

Lessons 1–2 times a week (12–14 h) and guided self study (36 h)

Target group:

International degree and post-graduate degree students and exchange students of the University

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Will be provided during the course.

Assessment methods and criteria:

Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grading scale is 1-5.

Person responsible:

Anne Koskela

Working life cooperation:

-

Other information:

Sign-up in WebOodi.

900013Y: Beginners' Finnish Course 1, 3 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900013Y	Beginners' Finnish Course 1 (OPEN UNI)	2.0 op

Proficiency level:

A1.2

Status:

The course is intended for the international students in every faculty of Oulu University.

Required proficiency level:

A1.1, Completion of the Survival Finnish course (900017Y) or the equivalent language skills.

ECTS Credits:

3 ECTS credits

Language of instruction:

As much Finnish as possible; English will be used as a help language.

Timing:

-

Learning outcomes:

By the end of the course the student can understand and use some familiar and common everyday expressions relating to her/himself and everyday situations. S/he can interact in a simple way provided the other person talks slowly and clearly and is willing to help. The student is able to read short simple texts and messages dealing with familiar topics. S/he also deepens her/his understanding of the Finnish language and communication styles.

Contents:

This is lower elementary course which aims to help students to learn communication skills in ordinary everyday situations. During the course, students broaden their vocabulary and knowledge of grammar and principles of pronunciation. They also practise to understand easy Finnish talk about everyday subjects, and reading and writing short and simple texts/messages.

The topics and communicative situations covered in the course are: talking about oneself, one's family, studies and daily routines, as well as asking about these things from other person, expressing opinions, describing people and things, talking about weather and seasons, the names of the months and colours.

The structures studied are: verb types, basics of the change of the consonants k, p and t in verbs and nouns, the genitive and partitive cases, possessive structure, some declension types for nouns (word types) and the basics of the local cases.

Mode of delivery:

Contact teaching and guided self study

Learning activities and teaching methods:

Lessons 2 times a week (26 h) and guided self study (50 h)

Target group:

International degree and post-graduate degree students and exchange students of the University

Prerequisites and co-requisites:

Completion of the Survival Finnish Course

Recommended optional programme components:

-

Recommended or required reading:

Gehring, S. & Heinzmann, S. Suomen mestari 1 (chapters 3 - 5)

Assessment methods and criteria:

Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grading scale is 1-5.

Person responsible:

Anne Koskela

Working life cooperation:

-

Other information:

Sign-up in WebOodi. The course will start right after the Survival Finnish course.

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 will be able to:

- solve challenging problems in organisations independently
- create a research plan, and define a research problem and research questions
- manage his own work according to the research plan
- utilise different information sources and critically evaluate the information obtained
- 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 is typically an empirical or a theoretical study.
Target group:
Industrial Engineering and Management students.
Prerequisites and co-requisites:
B.Sc. in Industrial Engineering and Management or equivalent. Courses that support the topic of the thesis.
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:
The course utilises a numerical grading scale 1-5. In the numerical scale zero stands for a fail. The thesis is assessed by using the thesis assessment form http://www.oulu.fi/sites/default/files/content/Dtyon_arviointi_English14.pdf
Person responsible:
Adjunct professor Jukka Majava
Working life cooperation:
The thesis is typically done for a private or public sector organisation.
Other information:
Instructions and forms related to Master's Thesis can found in here.
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

555207M: Basic Studies in other Universities/ Institutes, 0 - 30 op

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

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: Languages and Communication
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: Languages and Communication

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: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

ECTS Credits:

1 ECTS credits

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period I; biochemistry 3. autumn semester; biology 3. autumn semester, period I; chemistry 3. autumn semester, period II; computer science and engineering 2. spring semester, period IV; electrical engineering 3. spring semester, period III; geosciences 2. spring semester, period IV; geography 1. and 3. spring semester, *period III;* industrial engineering and management 3. year*;* information processing sciences 1. year; mathematics and physics 1. spring semester; mechanical engineering 3. year; mining engineering and mineral processing 3. year; process and environmental engineering 1. year, period I. Master's degree students in Industrial Engineering and Management 1st year.

Learning outcomes:

Upon completion of the course, the students:
- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and RefWorks reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

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

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology, Oulu mining school, Oulu School of architecture and Faculty of science. Optional for students of biochemistry. Compulsory also for the Master's degree students in Industrial Engineering and Management who have not earlier studies in information skills.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

pass/fail

Person responsible:

Ursula Heinikoski

Working life cooperation:

-

Other information:

-

FOREIGN LANGUAGE(choose one)

902150Y: Professional English for Technology, 2 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

902011P-05 TE3/ Professional English for Technology 2.0 op

Proficiency level:

CEFR B2 - C1

Status:

This course is the first English course for students in the engineering programmes in the Faculty of Technology (TTK), Faculty of Information Technology and Electrical Engineering (TST), and Oulu Mining School (KaTk).

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:

2 credits. The workload is 53 hours.

Language of instruction:

English

Timing:

The course takes place in the autumn semester (periods 1 and 2).

Learning outcomes:

By the end of the course, you can

- create and deliver effective presentations of a product, a company and company processes,
- apply appropriate cultural, linguistic and technical knowledge when presenting a product or company,
- formulate strategies for developing your English-language communication skills based on an evaluation of your own strengths and weaknesses.

Contents:

Scheduled as the first course of your English studies, Professional English for Technology (PET) has a strong focus on developing speaking skills necessary for working life. During PET, you will develop an idea for a new product or service and devise a business plan, and give a variety of short presentations in connection with your product or service. In addition, PET helps you to develop an awareness of your own language skills, encouraging you to develop strategies and techniques for effective learning.

Mode of delivery:

Contact teaching and independent study

Learning activities and teaching methods:

Lessons 24 hours / team work 22 hours / independent work 7 hours. Lessons include regular pair and group work in class. Team work includes the preparation of four short presentations (22 hours). Independent homework activities include an online vocabulary test (3 hours) and other small assignments (5 hours). Active participation is essential.

Target group:

Students in the engineering programmes: TTK (PO1, YMP1, KO1, TuTa1), TST (ST2, CSE2) and OMS1.

Prerequisites and co-requisites:

-

Recommended optional programme components:

This course is offered as the first course of your English studies.

Recommended or required reading:

Course materials will be provided by the teacher in electronic form.

Assessment methods and criteria:

The course utilises continuous assessment that is based on the learning outcomes of the course, including full and active participation in class, and the successful completion of module assignments and class presentations. Students must achieve a grade of 75% in the online vocabulary test.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Grading:

pass / fail

Person responsible:

Each engineering programme has its own Languages and Communication contact teacher for questions about English studies.

Working life cooperation:

-

Other information:

-

902143Y: Company Presentations, 2 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

CEFR B2-C1 (Average - Advanced)

Status:

This course is part of the compulsory foreign language studies in English for students in the Industrial Engineering and Management (TuTa) 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:

2 credits. The workload is 53 hours.

Language of instruction:

English

Timing:

The course is held in the autumn semester, during periods I and II.

Learning outcomes:

By the end of the course, students are expected to be able to:

- use principles of good presentation structuring for optimal clarity,
- establish and maintain audience rapport in the presentation setting,
- use principles of good slideshow design,
- present a company plan for Sales and Operations in English effectively, using appropriate style and vocabulary,
- use observation of self and others to continue developing and fine-tuning presentation skills.

Contents:

The aim of the course is to help students at all levels to better conceptualise what constitutes a good presentation, and to develop their confidence in giving presentations and interacting with an audience in a business context.
The early weeks of the course focus on development of vocabulary related to operations planning and oral activities in small groups. Students learn about key concepts in giving presentations, such as openings and closings, organisation of content, clear articulation, use of visual aids, and audience interaction.
In the second half of the course, teams of students plan, prepare and rehearse a company presentation on the Sales and Operations plan for a particular company. These activities lead to a team presentation in front of an audience.

Mode of delivery:

Contact teaching and independent study

Learning activities and teaching methods:

Lessons 24 hours / Independent work 29 hours.

Target group:

2nd year students of Industrial Engineering and Management

Prerequisites and co-requisites:

555225P Basics of Industrial Engineering and Management or similar knowledge.

Recommended optional programme components:

Students will simultaneously complete the *555226A Operations and Supply Chain Management* course.

Recommended or required reading:

Course materials will be provided by the teacher in electronic form, to be downloaded and brought to class.

Assessment methods and criteria:

The course utilises continuous assessment that is based on the learning outcomes of the course. In addition, full and active participation is required. Course assignments must be completed. Students must achieve a grade of 67% in the online vocabulary test and give a presentation as part of a team demonstrating the skills specified in the learning outcomes.

Grading:

Pass / fail.

Person responsible:

Suzy McAnsh

Working life cooperation:

-

Other information:

-

FOREIGN LANGUAGE(English 2 ECTS cr,elective)

902142Y: Business Correspondence, 2 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

CEFR B2 - C1 (All Levels)

Status:

This course can be chosen in partial completion of the English language requirement for students in the engineering programmes in the Faculty of Technology (TTK), Faculty of Information Technology and Electrical Engineering (TST), and Oulu Mining School (KaTk).

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:

2 credits. The workload is 53 hours

Language of instruction:

English

Timing:

The course takes place in both autumn (periods 1 and 2) and spring (periods 3 and 4) semesters.

Learning outcomes:

By the end of the course, you are expected to have demonstrated:

- the ability to write clear and effective business letters conveying information and details accurately,
- the ability to use an appropriate level of formality and style for business communications,
- mastery of the conventional formats and layouts of different types of business letters.

Contents:

The aim of this course is to introduce different types of business correspondence and the format used when communicating in writing. Types of correspondence include communication in business-to-business scenarios and between a business and the public.

Mode of delivery:

Self-access: the course operates within an Optima workspace, with online support from the teacher.

Learning activities and teaching methods:

Introductory session 2 hours / independent learning 51 hrs / optional text clinics. Assignments, instructions and course resources are available in the course Optima workspace. Completed assignments are submitted electronically to the teacher. The teacher provides feedback and any problems are discussed either by written electronic communication or at one of the optional text clinics.

Target group:

Students in the engineering programmes (TTK, TST and OMS)

Prerequisites and co-requisites:

-

Recommended optional programme components:

This is an elective course which can be taken after 902150Y PET by students in the engineering programmes (TTK, TST and OMS).

Recommended or required reading:

Course materials are provided in an electronic form that can be downloaded.

Assessment methods and criteria:

All assignments must be completed to a standard of effective business correspondence based on the learning outcomes of the course.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Grading:

Pass/Fail

Person responsible:

See contact teachers

Working life cooperation:

-

Other information:

-

902145Y: Working Life Skills, 2 op

Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Proficiency level:

CEFR B2 - C1 (All Levels)

Status:

This course can be chosen in partial completion of the English language requirement for students in the engineering programmes in the Faculty of Technology (TTK), Faculty of Information Technology and Electrical Engineering (TST), and Oulu Mining School (KaTk).

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:

2 ECTS credits. The workload is 53 hours.

Language of instruction:

English

Timing:

The course takes place in both autumn (periods 1 and 2) and spring (periods 3 and 4) semesters.

Learning outcomes:

By the end of the course, you are expected to

1. have demonstrated a good basic vocabulary related to job applications, meetings and negotiations,
2. have demonstrated an ability to create an effective CV and cover letter for a job application,
3. be able to communicate effectively and with a reasonable degree of fluency at job interviews and in meeting and negotiation contexts.

Contents:

The aim of this course is to help you to develop the English language skills needed to deal with situations related to everyday working life. The course focuses on 4 basic areas:
i) business communication (e.g. telephoning skills and correspondence),
ii) social English in working life situations,
iii) applying for a job,
iv) a general introduction to the language of meetings and negotiations.

Mode of delivery:

Contact teaching and independent study

Learning activities and teaching methods:

Lessons 26 hours / independent work 27 hours. Active participation is essential. The course includes regular pair and group work in class and independent homework activities.

Target group:

Students in the engineering programmes (TTK, TST and OMS).

Prerequisites and co-requisites:

-

Recommended optional programme components:

This is an elective course which can be taken after 902150Y PET by students in the engineering programmes (TTK, TST and OMS).

Recommended or required reading:

Course materials will be provided by the teacher in electronic form.

Assessment methods and criteria:

The course utilises continuous assessment that is based on the learning outcomes of the course. In addition, full and active participation is required, course assignments must be completed, and students must achieve a grade of 70% in two tests during the course. Students will be asked to take an end-of course exam if they have not otherwise demonstrated that they have achieved the learning outcomes by the end of the course.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass/Fail

Person responsible:

See contact teachers

Working life cooperation:

-

Other information:

-

CHOOSE ONE

901044Y: Second Official Language (Swedish), Written Skills, 1 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Opintokohteen kielet: Swedish

Leikkaavuudet:

901060Y	Second Official Language (Swedish), Written Skills	1.0 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.
This course includes also 901045Y Second Official Language (Swedish) Oral Skills, 1 ECTS credits.

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:

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

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. Sign up only to a course 901044Y Second Official Language (Swedish) Written Skills, 1 ECTS credits.
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.

901045Y: Second Official Language (Swedish), Oral Skills, 1 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Opintokohteen kielet: Swedish

Leikkaavuudet:

901061Y Second Official Language (Swedish), Oral Skills 1.0 op

MATHEMATICS

031010P: Calculus I, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Applied Mathematics and Computational Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Lusikka

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031010P Calculus I (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish. The course can be completed in English by intermediate exams or by a final exam.

Timing:

Autumn semester, period 1

Learning outcomes:

Upon completion of the course, the student identifies concepts of vector algebra, can use vector algebra for solving problems of analytic geometry, can explain basic characteristics of elementary functions, is able to analyse the limit and the continuity of real valued functions of one variable, 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 28 h / Group work 22 h / Self-study 85 h.

Target group:

-

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Grossman, S.I.: Calculus of One Variable; Grossman, 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:

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

Person responsible:

Ilkka Lusikka

Working life cooperation:

-

Other information:

-

031078P: Matrix Algebra, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
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

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn, during period 2. It is recommended to complete the course at the 1th autumn semester.

Learning outcomes:

The student is able to apply arithmetic operations of matrices and can solve system of linear equations by matrix methods and can apply matrix factorizations to find the solution of the system of linear equations. The student is able to recognize the vector space and understands the concepts of basis and dimension of a vector space and can analyse matrices by the parameters, vectors and vector spaces of matrices. He /She knows how to calculate determinant, eigenvalues and eigenvectors of a square matrix, and is able to diagonalize matrices and apply diagonalization to the simple problems.

Contents:

1. Vectors and matrices 2. Systems of linear equations. 3. Matrix factorizations. 4. Vector spaces. 5. The rank, nullity, row space and the column space of a matrix. 6. The determinant of a matrix. 7. Eigenvalues and eigenvectors of a matrix. 8. The diagonalization with applications.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h / Group work 22 h / Self-study 85 h.

Target group:

1. year students of technical sciences, mathematics and physics.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Recommented literature: Grossman, S.I: Elementary Linear Algebra; David C. Lay: Linear Algebra and Its Applications.

Assessment methods and criteria:

The course can be completed by intermediate exams (2 exams) or by a final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail

Person responsible:

Matti Peltola

Working life cooperation:

-

Other information:

-

031075P: Calculus II, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
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 ECTS credits / 135 hours of work

Language of instruction:

Finnish. The course can be completed in English by intermediate exams or by a final exam.

Timing:

Spring, period 3

Learning outcomes:

Upon completion of the course, the student is able to examine the convergence of series and power series of real terms, can explain the use of power series e.g. in calculating limits, 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 22 h / Self-study 85 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; Grossman S.I.: Multivariable Calculus, Linear Algebra, and Differential Equations; Adams, R.A.: A Complete Course Calculus.

Assessment methods and criteria:

Intermediate exams or a final exam.
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:

Ilkka Lusikka

Working life cooperation:

-

Other information:

-

031076P: Differential Equations, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Ruotsalainen Keijo
Opintokohteen kielet: Finnish
Leikkaavuudet:

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

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the spring, during period 4. It is recommended to complete the course at the 1th spring semester.

Learning outcomes:

The students can apply differential equations as a mathematical model. They can identify and solve various differential equations and they have knowledge on basic solvability of differential equations. The student can use the Laplace transform as a solution method.

Contents:

Ordinary differential equations of first and higher order.
Laplace transform with applications to differential equations.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h / Group work 22 h / Self-study 85 h.

Target group:

1. year students of technical sciences, mathematics and physics.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Recommented literature: Kreyszig, E: Advanced Engineering Mathematics;

Assessment methods and criteria:

The course can be completed by intermediate exams (2 exams) or by a final exam.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail

Person responsible:

Keijo Ruotsalainen

Working life cooperation:

-

Other information:

-

031021P: Probability and Mathematical Statistics, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
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 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

Spring semester, period 3

Learning outcomes:

After completing the course the student

1. knows the key concepts of probability and the most important random variables,

2. will be able to use them in calculating probabilities and parameters of probability distributions,
3. is capable of analyzing statistical data by calculating interval and point estimates for the parameters,
4. will be able to formulate statistical hypotheses and test them,
5. knows the basics of linear regression.

Contents:

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

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h/Exercises 20 h/Self study 87 h.

Target group:

The students in the engineering sciences. Other students are welcome, too.

Prerequisites and co-requisites:

The recommended prerequisities are the course 031010P Calculus I and some parts of the course 031075P Calculus II.

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:

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:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Jukka Kemppainen

Working life cooperation:

-

Other information:

-

PHYSICS

761118P: Mechanics 1, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

766343A	Mechanics	7.0 op
761111P	Basic mechanics	5.0 op
761101P	Basic Mechanics	4.0 op
766323A	Mechanics	6.0 op
761323A	Mechanics	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

- 761118P-01, Lectures and exam (4 cr)
- 761118P-02, Lab. exercises (1 cr)

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 30 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 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.

Assessment methods and criteria:

Both parts (761118P-01 and 761118P-02) will be graded separately. The final grade of the course is the weighted average of the grades of part 1 (4 cr) and part 2 (1 cr).
761118P-01: Three midterm exams or final examination
761118P-02: Two laboratory exercises
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Juha Vaara

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/761118P

Compulsory

761118P-01: Mechanics 1, lectures and exam, 0 op

Voimassaolo: 01.01.2017 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

766343A Mechanics 7.0 op
761111P-02 Basic mechanics, lab. exercises 0.0 op
761111P-01 Basic mechanics, lectures and exam 0.0 op
761111P Basic mechanics 5.0 op
761121P Physical Measurements I 3.0 op
761101P Basic Mechanics 4.0 op
761323A Mechanics 6.0 op
766323A Mechanics 6.0 op

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:

The whole course: Lectures 30 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 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.

Assessment methods and criteria:

Three small midterm exams or final examination.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Juha Vaara

Working life cooperation:

No work placement period

Other information:

Course website

761118P-02: Mechanics 1, lab. exercises, 0 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

766343A	Mechanics	7.0 op
761111P-01	Basic mechanics, lectures and exam	0.0 op
761111P-02	Basic mechanics, lab. exercises	0.0 op
761111P	Basic mechanics	5.0 op
761101P	Basic Mechanics	4.0 op
761323A	Mechanics	6.0 op
766323A	Mechanics	6.0 op

Other information:

Course website

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 ECTS cr

Language of instruction:

Finnish

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 30 h, 6 exercises (12 h), 2 laboratory exercises (8 h), self-study 83 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:

Four written intermediate examinations 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:

Timo Asikainen

Working life cooperation:

No work placement period

Other information:

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

761310A: Wave motion and optics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Alanko
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A	Wave motion and optics	7.0 op
761114P	Wave motion and optics	5.0 op
761114P-02	Wave motion and optics, lab. exercises	0.0 op
761114P-01	Wave motion and optics, lectures and exam	0.0 op
766329A	Wave motion and optics	6.0 op
761104P	Wave Motion	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish. The course material and exercises are available in English.

Timing:

First spring

Learning outcomes:

The student is able to treat different types of waves by methods of general theory of wave motion. The student is also able to solve problems related to basic optics and apply her/his knowledge to teaching and research in physics.

Contents:

General principles of wave motion, sound, electromagnetic waves, propagation of light, image formation in mirrors and lenses, optical instruments, interference, Fraunhofer diffraction, diffraction grating, laser principles.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h, exercises 14 h, 2 laboratory exercises (3 hours/exercise), self-study 90 h

Target group:

No specific target qroup

Prerequisites and co-requisites:

Basic skills in mathematics

Recommended optional programme components:

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

Recommended or required reading:

H. D. Young and R. A. Freedman, University Physics, Addison-Wesley, 2000 ja 2004, F. L. Pedrotti ja L. S. Pedrotti, Introduction to optics, Prentice-Hall, 2. ed., 1993 ja E. Hecht, Optics, (3rd ed.), Addison Wesley Longman, 1998.

Assessment methods and criteria:

Two written intermediate examinations or one final examination

Grading:

Numerical grading scale 0 – 5, where 0 is fail

Person responsible:

Seppo Alanko

Working life cooperation:

No work placement period

Compulsory

761310A-01: Wave motion and optics, lectures and exam, 0 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Alanko
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A	Wave motion and optics	7.0 op
761114P	Wave motion and optics	5.0 op

761114P-01 Wave motion and optics, lectures and exam 0.0 op
761114P-02 Wave motion and optics, lab. exercises 0.0 op
766329A Wave motion and optics 6.0 op
761104P Wave Motion 3.0 op

Ei opintojaksokuvauksia.

761310A-02: Wave motion and optics, lab. exercises, 0 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Alanko
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A Wave motion and optics 7.0 op
761114P Wave motion and optics 5.0 op
761114P-01 Wave motion and optics, lectures and exam 0.0 op
761114P-02 Wave motion and optics, lab. exercises 0.0 op
766329A Wave motion and optics 6.0 op
761104P Wave Motion 3.0 op

Ei opintojaksokuvauksia.

COMPUTER SCIENCE

521141P: Elementary Programming, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
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 ECTS Cr

Language of instruction:

Lectures and learning material are in Finnish. The course can be completed in English by self-studying from a book, completing assignments and exercises on the course learning environment, and delivering a final project.

Timing:

Fall, period 1. There is an option to extend the course to the 2nd period in cases where completing in one period doesn't fit the student's schedule.

Learning outcomes:

1. Is capable of solving problems in the computer's terms

2. Understands the basic concepts of programming

3. Knows the basics of the Python programming language

4. Is able to implement programs independently

5. Is able to use the internet to find information about programming

Contents:

Problem solving with programming, basic concepts of programming, writing Python code.

Mode of delivery:

Web-based teaching + face-to-face teaching

Learning activities and teaching methods:

30h of exercise groups, 105h self-studying in the web.

Target group:

1 st year students of computer science and engineering, electrical engineering, medical and wellness technology and industrial and engineering management, 2nd year students of physics, 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:

Web material in an online learning environment. Address 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
Read more about assessment criteria at the University of Oulu webpage.

Grading:

pass/fail.

Person responsible:

Mika Oja

Working life cooperation:

-

Other information:

-

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: Marko Korhonen
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). Mid-term exams (2)or Final exam (3 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: Acemoglu, D., Laibson D. and List, J.A., Economics, 2015
and 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.
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:

University lecturer Marko Korhonen

Working life cooperation:

Students learn relevant and useful facts about the operation of the markets, and the aggregate economy to an extent that they can reasonably utilize those facts and knowledge in the decision making of the business they are working at.

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: Kristiina Henttu-Aho

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 A (2nd year)

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:

Face-to-face 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, 7th or 8th ed. Cengage Learning EMEA. Chapters 1-11 (8th ed.);
Supplementary material: Järvenpää, M.- Länsiluoto, A - Partanen, V. – Pellinen, J.: Talousohjaus ja kustannuslaskenta, WSOYpro, chapters 1-8.

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:

Understanding of management accounting systems is typically an important part of work for graduates in economics and business administration and an essential part of occupations like management accountant or controller.

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 will be able to:

- understand and apply basic terminology of sales and marketing and the fundamentals of customer oriented approach
- recognise sales and marketing process phases, plan product and service offerings for a particular customer segment, and create sales and marketing plan
- explain the following concepts: sales pipeline, segmentation, marketing mix, value proposition and branding

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, 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:

Parviainen, 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 utilises continuous assessment. During the course, there are individual assignments and a sales simulation exercise (50 % of the grade) and a group work (50 % of the grade).

Grading:

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

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

The students will do a group work in cooperation with case companies.

Other information:

Substitutes courses 721412P Product and Market Strategies (2013 - 2014) and 724106P Principles of Marketing (2014 - 2015) in IEM student's PSP's.

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

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 will be able to:

- describe what industrial engineering and management (or operations management) means
- explain the core concepts of business operations and utilise these concepts in describing and analysing operations of an organisation
- explain in general terms the factors that affect economic performance of organisations
- utilise the terminology used in industrial engineering and management (operations management), describe the financial processes of companies and based on this describe the use of cost accounting in organisational decision-making

- 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, accounting and cost accounting, investments and financial planning, 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. In addition, recommended materials include Martinsuo, M. et al. (2016) Teollisuustalous kehittyvässä liiketoiminnassa chapters 7-9, 16 and 26.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

-

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 2.

Learning outcomes:

Upon completion of the course, the student will be able to:

- describe explain the essential concepts and methods related to project management
- apply project management methods to create a schedule for a project and calculate critical path
- understand essential concepts related to project cost management and able to apply earned value method and three point estimate to manage project costs
- recognises the essential tasks of project risk management

Contents:

Defining project management, project goals and objectives, project phases and project life-cycle management, project planning, organising and scope management, schedule management, cost management, earned value calculation and project risk management, project stakeholder management, project communications management, the role of project manager, new modes of project delivery

Mode of delivery:

The tuition will be implemented as web-based teaching.

Learning activities and teaching methods:

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:

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:

Assistant professor Kirsi Aaltonen

Working life cooperation:

The course includes guest lectures from industry

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

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 will be able to:

- explain the basic terms of occupational safety and health
- assess the importance of occupational safety, health and well-being at work
- assess the significance of occupational safety in the improving of productivity and quality
- apply different safety analysis
- explain 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:

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Recommended optional programme components:

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Recommended or required reading:

Mertanen V. 2015. Työturvallisuuden perusteet. Helsinki: Työterveyslaitos. 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:

MSc Henri Jounila

Working life cooperation:

-

Other information:

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

555226A: Operations and supply chain management, 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 will be able to:

- describe different production types
- apply different forecasting methods, plan needed production capacity, and apply location and transportation decisions related methods
- master common inventory management methods and aggregated and short-term scheduling
- 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 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 Company presentations course simultaneously.

Recommended or required reading:

Lecture and exercise materials. Krajewski, L.J. et al. (2012) Operations management: processes and supply chains, 10th ed. Pearson. In addition, recommended material includes chapter 13 in Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson.

Assessment methods and criteria:

This course utilises 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:

Adjunct professor Jukka Majava

Working life cooperation:

The group work will be done for a real company by using public information sources.

Other information:

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

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

Opettajat: Arto Reiman

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:

Upon completion of the course, the student will be able to:

- use 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
- develop well-being at work in the contexts of labor legislation, good practices, productivity, occupational safety expertise, management and human resources
- utilise basic knowledge, search for more information and knows the key players in the field
- know 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

- know the basics how to 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
- know essential national and international regulation and strategic goal setting practices, good practices of the case companies, current trends, and methods in research.

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:

Applicable parts of Arnold, J. et al. (2010), Work Psychology; Understanding Human Behaviour in the Workplace. 5th Edition. Financial Times/Prentice Hall and Aura, O. & Ahonen, G. Strategisen hyvinvoinnin johtaminen, Alma Talent. Other literature will be informed during the course.

Assessment methods and criteria:

This course utilises continuous assessment including exercises during the lectures (weight 20 %), seminar work (weight 40 %) and examination (weight 40 %).

Grading:

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

Person responsible:

Dr. Arto Reiman

Working life cooperation:

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Other information:

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 of the course, the student will be able to:

- explain the role of process and quality management in a business organisation
- develop business processes based on the principles of quality management and appropriate tool

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

Target group:

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

Prerequisites and co-requisites:

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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 weekly course exercises (50 % of the course grade) and an exam (50 %).

Grading:

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

Person responsible:

University lecturer Osmo Kauppila.

Working life cooperation:

No.

Other information:

Substitutes course 555281A Basic Course of Quality Management.

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

Ei opintojaksokuvauksia.

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
Opettajat: Teemu Lappi
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.

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 teacher tutor will review and grade the report.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

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Recommended optional programme components:

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

Recommended or required reading:

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Assessment methods and criteria:

The Report.

Grading:

Fail/Pass

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

Yes

Other information:

Substitutes course 555210A Internship.

555208M: Intermediate Studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

Electives

477013P: Introduction to Process and Environmental Engineering, 5 op

Voimassaolo: 01.12.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Eetu-Pekka Heikkinen

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr / 135 hours of work.

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during periods I and II. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. unit operations, material management, phenomenon-based considerations, automation, energy and environment) 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. Unit operations. 2. Material balances. 3. Phenomenon-based considerations. 4. Material transport. 5. Process control and automation. 6. Principles in use, planning and protection of water and land resources: primary production, municipalities and industry. 7. Energy systems. 8. Productive activity as a part of society.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Pair exercises and contact-education that supports these exercises. 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 courses www-site.

Assessment methods and criteria:

Pair exercises. Please note that the course is not organised in English.

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:

-

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.

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P	General and Inorganic Chemistry A	5.0 op
780109P	Basic Principles in Chemistry	4.0 op

ECTS Credits:

5 credits/134 hours of work

Language of instruction:

Finnish

Timing:

1st autumn

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory. Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Lecturer Minna Tiainen

Working life cooperation:

No

Other information:

No

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:

Spring periods 3 and 4.

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:

Finnish

Timing:

The course is held in the autumn semester, during period II. It is recommended to complete the course at the 2nd autumn semester.

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. 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. It is also available via courses www-site.

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.

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:

-

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

Opettajat: Hiltunen, Jukka Antero

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 2

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

Opettajat: Ainassaari, Kaisu Maritta

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.

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:

The course 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 4 intermediate exams. The course can also be completed by final examination.

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 the 2nd period. 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

Opettajat: Ainassaari, Kaisu Maritta, Anna-Kaisa Ronkanen

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.

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:

The course 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 Kaisu Ainassaari

Working life cooperation:

No

Other information:

-

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

Electives

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

ECTS Credits:
5 ects / 133 hours of studying work.
Language of instruction:
Finnish, can be completed in English as a book examination
Timing:
Lectures, Autumn periods 1.-2. Exercises, periods 1. - 2. , and practical work, period 2.

Learning outcomes:

The aim of the course is to teach students to read and to draw machine drawings and to carry out standard specifications of description methods, legends and dimensioning. Students also learn how to use the computer system for modeling and drafting machine parts and assemblies.

Contents:

Purpose of machine drawing; Description and dimensioning of parts; Design and viewpoints of manufacturing; Specifications of welds and surface roughness and tolerances on drawings; Principles of diagrammatic drawings. Machine parts and assemply modeling and making drawings with computer aided design software.

Mode of delivery:

Face-to-face

Learning activities and teaching methods:

Lectures 30 h / exercises 30 h / computer aided design exercises 20 h / practical work 53 h. Drawing and Modeling exercises will be group exercises and practical work will be individual.

Target group:

1st year mechanical engineering students

Recommended or required reading:

Pere, A.: Koneenpiirustus1 & 2, Kirpe Oy, Espoo. Other literature will be informed on lectures.

Assessment methods and criteria:

Final exam 60%, exercises 30% and practical work 30% of the final grade.

Grading:

Numerical grading scale 1-5 / fail

Person responsible:

University lecturer Tapio Korpela

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

ECTS Credits:

5 ETCS / 149 hours of work

Language of instruction:

Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.

Timing:

The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

After the course, the student can calculate forces and moments of loaded structures using equations of vector algebra and trigonometry. He/she can draw a free body diagram of the force system and then solve the unknown forces by using equations of equilibrium. He/she can determine resultants from uniformly distributed loads and apply Coulomb's law of friction in the problem equilibrium. The student can solve problems of internal and external forces of particle systems and rigid body systems in case of static equilibrium. Especially, he/she can draw shear force and bending moment diagrams for beam structures.

Contents:

Fundamental laws and concepts in statics. Force systems and their treatment. Equilibrium of particles and rigid bodies. Static forces in isostatic structures such as beams, frames, cables and trusses. Friction.

Mode of delivery:

Implemented as Face-to-face -teaching.

Learning activities and teaching methods:

Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:

Compulsory for candidate degree students of mechanical engineering programme.

Prerequisites and co-requisites:

Now prerequisites 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:

Salmi, T.: Statiikka, Pressus Oy, Tampere 2005; Beer, F., Johnston, R.: Vector Mechanics for Engineers, Statics, McGraw-Hill Book Company, 1996.

Assessment methods and criteria:

In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

Grading:

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

Person responsible:

University teacher Hannu Lahtinen

Other information:

The course gives ability for understanding static equilibrium, ability for determining force balance in structures and readiness for later studies.

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

ECTS Credits:

5 ects/135 hours study time

Language of instruction:

Finnish

Timing:

Lectures and laboratory works, 3 and 4 periods

Learning outcomes:

The aim of the course is to introduce the common physical (metallurgical) phenomena in metal alloys and other construction materials. He/she understands the effect of different microstructural features on the mechanical properites and the processibility of the above mentioned materials. Finally, he/she is familiar with typical non-destructive and destructive testing techniques in material science.

Contents:

Solidification and phase transformations, plastic deformation, static recovery and recrystallization, effect of microstructure on mechanical properties of metal alloys, typical corrosion mechanisms, fatigue in metal alloys, creep in metal alloys, and non-destructive and destructive material testing.

Mode of delivery:

Face-to face teaching

Learning activities and teaching methods:

32 hours lectures/ 12 hours laboratory exercises/91 hours indepedent studies. Three laboratory excersises are included in the course.

Prerequisites and co-requisites:

None

Recommended or required reading:

Lecture booklet (In Finnish). Other material will be announced at the beginning of the course.

Assessment methods and criteria:

Final exam. The final grade is based on the final exam.

Grading:

Numerical grading scale 1 - 5. Laboratory exercises will be graded as "pass"/"fail".

Person responsible:

Olli Nousiainen

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

ECTS Credits:

5 ETCS / 149 hours of work

Language of instruction:

Lectures in Finnish, foreign students follow the course by reading independently the books in English and taking part to the exercises and exams where all material is given in English.

Timing:

The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 1st spring semester.

Learning outcomes:

After the course, the student can determine stresses and strains of structures under loading. He/she can change the general stress and strain states from one coordinate system to another and can also apply constitutive equations in calculations. The student can dimension typical structures such as tension and compression bars, torsion bars and straight beams.

Contents:

Purpose and goals of strength of materials. Experimental elastic properties and strength of steel. Tension and compression of straight bars. Round torsion bar under shear force and torsion loads. Stresses and deflection curves in straight beams under bending moments. Stress state, strain state and constitutive equations, principal stresses, Mohr's circle. Stress hypotheses.

Mode of delivery:

Implemented as Face-to-face -teaching.

Learning activities and teaching methods:

Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:

Compulsory for Bachelor's degree students of mechanical engineering programme.

Prerequisites and co-requisites:

The recommended preceding course is 461102A Statics.

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:

Salmi, T., Pajunen, S.: Lujuusoppi, Pressus Oy, Tampere, 2010, Pennala, E.: Lujuusopin perusteet, Moniste 407, Otatieto 2002; Karhunen, J. & al.: Lujuusoppi, Otatieto 2004; Beer, F., Johnston, E., Mechanics of materials , McGraw-Hill, 2011; Gere, J.M., Timoshenko, S.P., Mechanics of Materials, Chapman&Hall, 1991.

Assessment methods and criteria:

In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

Grading:

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

Person responsible:

University teacher Hannu Lahtinen

Other information:

The course looks into the most important principal concepts of strenght of materials and gives ability for dimensioning of simple structures such as straight bars in tension, compression or torsion loads and straight beams under bending moments.

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

ECTS Credits:

10 ects / 267 hours of studying work.

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Lectures and exercises arranged at autumn periods 1 -2., practical work end of 2 period.

Learning outcomes:

Upon completion of this course, the student will know operating principals, material selection and dimensioning of machine elements. Learning outcomes: Upon completion of this course, the student is able to measure dimensions of the machine elements.

Contents:

Joint elements (screws, welds, etc.); Rotating machine elements (shafts, bearings, clutches, brakes); Power transmission elements (gears, chains, belts, etc.); Basics of needed vibration isolation to ensure smooth operation of machines

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 60 h / exercises 14 h /practical work 120 h / individual studies 73 h.

Target group:

2nd year mechanical engineering student

Prerequisites and co-requisites:

Machine Drawing and CAD

Recommended or required reading:

Airila, M.& al. Koneenosien suunnittelu. Porvoo WSOY, 1995; Shigley, J. E. ja Mischke, C. R. Mechanical Engineering Design. New York, McGraw-Hill,1983.

Assessment methods and criteria:

Final Exam, homeworks and practical work. Final exam is 50% and practical work 50% of final grade. Homeworks will be graded pass/fail.

Grading:

Numerical grading scale 1-5 / fail

Person responsible:

University lecturer Tapio Korpela

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

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

Lectures and exercises periods 3. - 4.

Learning outcomes:

The aim of this course is to give students a general view of manufacturing methods. The primary emphasis of the course is on the cutting methods of metals. Upon completion of the course, the student is able to name the key areas of manufacturing technology and the most important cutting methods. In addition, the student is able to choose the applicable cutting methods and tools for achieving the basic manufacturing tolerances. The student is able to explain the basic features of the most common materials of cutting tools.

Contents:

The course includes 10 hours lectures, an examination and practical exercises of metal cutting in the laboratory.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures and exercises

Recommended or required reading:

Ihalainen, E., Aaltonen, K., Aromäki, M., Sihvonen, P.: Valmistustekniikka, Otatieto Oy, Helsinki 2007, 490 s. Supplementary material will be given during the lectures.

Assessment methods and criteria:

Exam and exercises are graded 1-5. Half of the final grade is based on the grade of the exercises and another half of the final grade is based on the grade of the exam.

Grading:

Numerical grading scale 1-5.

Person responsible:

Jouko Heikkala

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

ECTS Credits:

5 ECTS credits / 120 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the spring semester, during periods 1 and 2. It is recommended to complete the course at the 2st spring semester.

Learning outcomes:

The aim of this course is to provide students with the ability to examine the relationship between the forces on a solid body and the resulting motion, position, speed and acceleration of the body. Learning outcomes: Upon completing the required coursework, the student knows and is able to explain the fundamental quantities and the base laws of the classical mechanics. He/she is able to choose an appropriate coordinate system and analyze the motion - position, velocity, and acceleration - of the parts of a device. The student is able to draw a free body diagram of a moving system, and compose and derive the equations of motion for a system using the direct momentum method, the work-energy method, and the impulse-momentum method.

Contents:

Introduction; Kinematics of a particle; Plane kinematics of a rigid body; Kinetics of a particl;. Basics of mechanical vibrations; Kinetics of a system of particles; Plane kinetics of a rigid body.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 45 h / Exercise 30 h / Self-study 45 h.

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:

Salmi, T. (2003) Dynamiikka 1, kinematiikka, Pressus; Salmi, T. (2002) Dynamiikka 2, kinetiikka, 2. p., Pressus. Oheiskirjallisuus: Salonen, E.M. (2000) Dynamiikka I, 8. korj. p., Otatieto; Salonen, E.M. (1999) Dynamiikka II, 8. korj. p., Otatieto; Beer, F., Johnston, E.(2007) Vector Mechanics for Dynamics, 9.ed., McGraw-Hill

Assessment methods and criteria:

This course utilizes continuous assessment. During the course, there are three intermediate exams. In addition to this, the students will be asked to calculate homeworks, and theses homeworks will be assessed. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Optima Study Portal.

Grading:

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

Person responsible:

University Lecturer Hannu Koivurova

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.

Electives

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

Opettajat: Jouni Laurila

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

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 3rd autumn semester.

Learning outcomes:

Upon completion of the course, the student will be able to explain the most important terms related to the field of maintenance, define what the maintenance is and to tell how it affects on productivity, safety and environment. After the course, the student is able to calculate the most important factors and indicators related to the reliability and classify maintenance actions to corrective and predictive operations. In addition, he/she knows how the maintenance must to take into consideration during different planning tasks.

Contents:

The basic concepts, objectives and effects of the maintenance

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h / group work 20 h / self-study 83 h

Target group:

Bachelor's degree students in the mechanical engineering

Recommended optional programme components:

The course is an independent entity.

Recommended or required reading:

Lecture handout and the other material delivered during the course. Supplementary readings: Järviö, J. et al., Kunnossapito. Helsinki, KP-Media Oy / Kunnossapitoyhdistys ry 2007.

Assessment methods and criteria:

Final examination and the other graded assignments

Grading:

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

Person responsible:

Lecturer Toni Liedes

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

ECTS Credits:

5 / 135 h total study time

Language of instruction:

Finnish

Timing:

Autumn semester, periods I & II. Recommended for third study year.

Learning outcomes:

The object is to get students to understand the fundamentals of theory of plasticity. After course, student should have a readiness to apply theory of plasticity to metal forming analyses and to solve the simple stress distributions based on external loads.

Contents:

During course, common constitutive material models for different metals are examined. Processing methods effecting to the microstructure like rolling, forging, extrusion and wire drawing are included in course as like the sheet metal forming processes. In addition, e.g. the information from tensile tests is combined to the theory of plasticity and constitutive material models.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Lectures, literature study and examination

Target group:

Compulsory in the Bachelor's stage for all Mechanical Engineering students majoring in Materials Engineering.

Prerequisites and co-requisites:

Before registering for this course the student must have successfully completed the following courses: 465101A An Introduction to Materials for Mechanical Engineering, 465102A Materials for Mechanical Engineering

Recommended or required reading:

Lecture notes, Korhonen, A. and Larkiola, J., Ohutlevyjen muovauksen perusteet, Actaoulu C1 2012, 207p

Assessment methods and criteria:

Final grade assessed on the basis of a final examination (weighting 0.8) and literature work (weighting 0.2).

Grading:

Examination scale 0-5 ja literature work 0-2. Grade 0 fail.

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

ECTS Credits:

5 ects/135 hours study time

Language of instruction:

Finnish

Timing:

Lectures and laboratory works, 3 and 4 periods

Learning outcomes:

The aim of the course is to introduce the common physical (metallurgical) phenomena in metal alloys and other construction materials. He/she understands the effect of different microstructural features on the mechanical properites and the processibility of the above mentioned materials. Finally, he/she is familiar with typical non-destructive and destructive testing techniques in material science.

Contents:

Solidification and phase transformations, plastic deformation, static recovery and recrystallization, effect of microstructure on mechanical properties of metal alloys, typical corrosion mechanisms, fatigue in metal alloys, creep in metal alloys, and non-destructive and destructive material testing.

Mode of delivery:

Face-to face teaching

Learning activities and teaching methods:

32 hours lectures/ 12 hours laboratory exercises/91 hours indepedent studies. Three laboratory excersises are included in the course.

Prerequisites and co-requisites:

None

Recommended or required reading:

Lecture booklet (In Finnish). Other material will be announced at the beginning of the course.

Assessment methods and criteria:

Final exam. The final grade is based on the final exam.

Grading:

Numerical grading scale 1 - 5. Laboratory exercises will be graded as "pass"/"fail".

Person responsible:

Olli Nousiainen

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

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

Lectures and exercises periods 3. - 4.

Learning outcomes:

The aim of this course is to give students a general view of manufacturing methods. The primary emphasis of the course is on the cutting methods of metals. Upon completion of the course, the student is able to name the key areas of manufacturing technology and the most important cutting methods. In addition, the student is able to choose the applicable cutting methods and tools for achieving the basic manufacturing tolerances. The student is able to explain the basic features of the most common materials of cutting tools.

Contents:

The course includes 10 hours lectures, an examination and practical exercises of metal cutting in the laboratory.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures and exercises

Recommended or required reading:

Ihalainen, E., Aaltonen, K., Aromäki, M., Sihvonen, P.: Valmistustekniikka, Otatieto Oy, Helsinki 2007, 490 s. Supplementary material will be given during the lectures.

Assessment methods and criteria:

Exam and exercises are graded 1-5. Half of the final grade is based on the grade of the exercises and another half of the final grade is based on the grade of the exam.

Grading:

Numerical grading scale 1-5.

Person responsible:

Jouko Heikkala

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

Opettajat: Timo Kauppi

Opintokohteen kielet: Finnish

Language of instruction:

Finnish

Timing:

Lectures and materials selection exercise take place during the periods 1 and 2, autumn term.

Learning outcomes:

The objective of the course is to familiarize the student with basic matters concerning properties of metallic and non-metallic structural materials, the area within which the materials are in use, and the principles of materials selection. After the course, the student is able to classify different structural materials such as steels, cast irons, non-ferrous metals, polymer based materials and structural ceramics. The student masters structural materials and their selection so that he/she is able to select the most proper structural material for a product or component.

Contents:

Common structural materials in mechanical engineering, including steels (structural, QT, tool, stainless), cast irons, non-ferrous metal alloys (aluminium, titanium, magnesium, copper, nickel) and polymer based materials (structural plastics, plastics composite, elastomers, rubbers). Materials selection taking into account different demands. Ashby diagrams.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The course is made up of lectures (32 h) and a materials selection exercise in small group during the periods 1 and 2.

Prerequisites and co-requisites:

Reommended: 465101A Introduction to Materials for Mechanical Engineering.

Recommended or required reading:

Lecture booklet (in Finnish); Exercise materials

Assessment methods and criteria:

The final grade is based on the combined points from materials selection exercise (0,2) and exam (0,8).

Grading:

Numerical grading scale 1-5 / fail.

Person responsible:

Olli Nousiainen

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: Timo Kauppi

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

ECTS Credits:

5 cr; study time 135 h

Language of instruction:

Finnish

Timing:

Periods I-II, autumn term.

Learning outcomes:

After the course, the student is able to select the most suitable heat treatment process and to give the main characteristics of the heat treating parameters for achieving the required properties such as yield/tensile strength, ductility, toughness, surface hardness and/or fatigue strength. He/she is also able to explain the metallurgical phenomena occurring in a sample during heat treatment. In the area of welding technology, the student is able to explain the most essential principles and applications of the conventional welding and cutting processes. He/she is able to estimate weldability of different materials and to analyze the factors affecting weldability. He can also explain the most essential matters regarding weld joint properties, weld defects and their inspection, and a healthy working environment. In addition, the student is generally able to take into account the effects of productivity and costs on the competitiveness.

Contents:

Heat treating and welding processes, their applicability.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures (32 h) will take place during period 3, and the three laboratory exercises in small groups will be during periods I – II. The final grade is based on the points from the final exam or small exams. The laboratory exercises will be graded as pass/fail.

Prerequisites and co-requisites:

465101A Introduction to Materials for Mechanical Engineering; 465102A Materials for mechanical Engineering.

Recommended or required reading:

Lecture booklet (in Finnish). Exercise materials.

Assessment methods and criteria:

Midterm exams or one final exam is required and accepted exercises.

Grading:

Numerical grading scale 1-5.

Person responsible:

Jouko Leinonen

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

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during period 1 and 2. It is recommended to complete the course at the 3rd autumn semester.

Learning outcomes:

Quality in Production is the supplementary course for the students graduating in the field of Functions of Management in Industry. The aim of this course is to understand the effects of a comprehensive quality control on the functions and costs of an enterprise and the principles of realization of quality assurance
Learning Outcomes: Upon completion of the course, the student is able to specify the concept of quality, explain the quality control in different phases of production and explain how it is possible to realize quality assurance by using different methods and principles of quality assurance. In addition, the student is able to explain the principle of quality system and to plan the quality system according to the requirements of quality standards. The student can explain the use of measuring instruments needed in workshop quality assurance.

Contents:

Concept of quality; TQC managing philosophy; Quality control in different phases of production; Quality costs; Methods of quality assurance; Quality system of a company; Quality policy in subcontracting; Quality circles.;SFS-ISO 9000 quality standards.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

The course consists of lectures (20h), exercises (10h), practical work (30h) and shelf-study (73h).

Recommended or required reading:

Ishikawa, Kaoru; What is Total Quality Control? Prentice Hall, 1985; Ishikawa, K. Introduction to Quality Control, Chapman & Hall, London, 1990; Shingo, Shigeo; Zero Quality Control; Source Inspection and Poka-Yoke System, Productivity Press, 1986.

Assessment methods and criteria:

Final examination, the final grade is based on the combined points from the final exam (grade 0.7) and exercises (grade 0.3).

Grading:

Numerical grading scale 1-5.

Person responsible:

Heikki Pirkola

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
Opettajat: Pirkola, Heikki Juhani
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

ECTS Credits:

5 ects/135 hours of work

Language of instruction:

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

Timing:

Lectures and exercises take place during the spring periods III - IV.

Learning outcomes:

The objective of the course is to familiarize students with the fundamentals of the functions and manufacturing methods of an engineering workshop. In order to apply manufacturing technology, students must know the features of different alternatives and be able to make technically and economically correct choices and combinations. This course emphasizes practicality and a general view of production. After the course, the student is capable of explaining manufacturing functions and methods of an engineering workshop. He/she is able to select parts manufacturing methods, machining data, machine tools and tooling equipment. In addition he/she can evaluate the alternatives of production automation in manufacturing functions.

Contents:

Features of different machining methods and machine tools; Selection of a blank machining method and machine tool according to type of work piece, accuracy and volume of production; Costs and technological possibilities of different machining methods; A review of control techniques, programming, jigs and tools

Mode of delivery:

Face-to-face -teaching

Learning activities and teaching methods:

Lectures 40 h and exercises 55 h (10 h of guided teaching) are held during periods III and IV. The course will be passed with a final exam and exercises which need to be returned and accepted. The final grade is a combined result of exercises and a final exam.

Prerequisites and co-requisites:

463101A Introduction to Manufacturing Technology

Recommended or required reading:

Manufacturing, Engineering & Technology, Fifth Edition, by Serope Kalpakjian and Steven R. Schmid. ISBN 0-13-148965-8. © 2006 Pearson Education, Inc., Upper Saddle River, NJ. The additional material that is in English will be given distributed at the lectures.

Assessment methods and criteria:

Final exam. The final grade is based on the combined points from exercises (grading 0,4) and the finai exam (grading 0,6).

Grading:

Numerical grading scale 1-5.

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

ECTS Credits:

5 ects / 133 hours of studying work.

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Lectures, Autumn periods 1.-2. Exercises, periods 1. - 2. , and practical work, period 2.

Learning outcomes:

The aim of the course is to teach students to read and to draw machine
drawings and to carry out standard specifications of description methods,
legends and dimensioning. Students also learn how to use the computer system for modeling and drafting machine parts and assemblies.

Contents:

Purpose of machine drawing; Description and dimensioning of parts; Design
and viewpoints of manufacturing; Specifications of welds and surface roughness and tolerances on drawings; Principles of diagrammatic drawings. Machine parts and assemply modeling and making drawings with computer aided design software.

Mode of delivery:

Face-to-face

Learning activities and teaching methods:

Lectures 30 h / exercises 30 h / computer aided design exercises 20 h / practical work 53 h. Drawing and Modeling exercises will be group exercises and practical work will be individual.

Target group:

1st year mechanical engineering students

Recommended or required reading:

Pere, A.: Koneenpiirustus1 & 2, Kirpe Oy, Espoo. Other literature will be informed on lectures.

Assessment methods and criteria:

Final exam 60%, exercises 30% and practical work 30% of the final grade.

Grading:

Numerical grading scale 1-5 / fail

Person responsible:

University lecturer Tapio Korpela

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

Opettajat: Jouni Laurila

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

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 3rd autumn semester.

Learning outcomes:

Upon completion of the course, the student will be able to explain the most important terms related to the field of maintenance, define what the maintenance is and to tell how it affects on productivity, safety and environment. After the course, the student is able to calculate the most important factors and indicators related to the reliability and classify maintenance actions to corrective and predictive operations. In addition, he/she knows how the maintenance must to take into consideration during different planning tasks.

Contents:

The basic concepts, objectives and effects of the maintenance

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h / group work 20 h / self-study 83 h

Target group:

Bachelor's degree students in the mechanical engineering

Recommended optional programme components:

The course is an independent entity.

Recommended or required reading:

Lecture handout and the other material delivered during the course. Supplementary readings: Järviö, J. et al., Kunnossapito. Helsinki, KP-Media Oy / Kunnossapitoyhdistys ry 2007.

Assessment methods and criteria:

Final examination and the other graded assignments

Grading:

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

Person responsible:

Lecturer Toni Liedes

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

ECTS Credits:

5 ects/135 hours study time

Language of instruction:

Finnish

Timing:

Lectures and laboratory works, 3 and 4 periods

Learning outcomes:

The aim of the course is to introduce the common physical (metallurgical) phenomena in metal alloys and other construction materials. He/she understands the effect of different microstructural features on the mechanical properites and the processibility of the above mentioned materials. Finally, he/she is familiar with typical non-destructive and destructive testing techniques in material science.

Contents:

Solidification and phase transformations, plastic deformation, static recovery and recrystallization, effect of microstructure on mechanical properties of metal alloys, typical corrosion mechanisms, fatigue in metal alloys, creep in metal alloys, and non-destructive and destructive material testing.

Mode of delivery:

Face-to face teaching

Learning activities and teaching methods:

32 hours lectures/ 12 hours laboratory exercises/91 hours indepedent studies. Three laboratory excersises are included in the course.

Prerequisites and co-requisites:

None

Recommended or required reading:

Lecture booklet (In Finnish). Other material will be announced at the beginning of the course.

Assessment methods and criteria:

Final exam. The final grade is based on the final exam.

Grading:

Numerical grading scale 1 - 5. Laboratory exercises will be graded as "pass"/"fail".

Person responsible:

Olli Nousiainen

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

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

Lectures and exercises periods 3. - 4.

Learning outcomes:

The aim of this course is to give students a general view of manufacturing methods. The primary emphasis of the course is on the cutting methods of metals. Upon completion of the course, the student is able to name the key areas of manufacturing technology and the most important cutting methods. In addition, the student is able to choose the applicable cutting methods and tools for achieving the basic manufacturing tolerances. The student is able to explain the basic features of the most common materials of cutting tools.

Contents:

The course includes 10 hours lectures, an examination and practical exercises of metal cutting in the laboratory.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures and exercises

Recommended or required reading:

Ihalainen, E., Aaltonen, K., Aromäki, M., Sihvonen, P.: Valmistustekniikka, Otatieto Oy, Helsinki 2007, 490 s. Supplementary material will be given during the lectures.

Assessment methods and criteria:

Exam and exercises are graded 1-5. Half of the final grade is based on the grade of the exercises and another half of the final grade is based on the grade of the exam.

Grading:

Numerical grading scale 1-5.

Person responsible:

Jouko Heikkala

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

ECTS Credits:

7 cr / 187 hours of work

Language of instruction:

Finnish, the course can also be completed in English

Timing:

Organized during the autumn semester. Lectures and seminar during period 1, demonstrations and practical work during period 2.

Learning outcomes:

The student can apply laser machining processes, electrical discharge machining, abrasive water jet cutting and additive manufacturing processes in today's machine shops as well as choose suitable equipment for various applications. The student can also describe the main features, capabilities, limitations and trends of the aforementioned processes.

Contents:

Classes and seminars deal with the fundamentals and equipment of laser material processing, electrical discharge machining, abrasive water jet cutting and additive manufacturing processes. Other processes may be added as deemed suitable. Material interaction, process and equipment possibilities and limitations. Additionally, safety and health aspects of the processes are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The course consists of lectures and seminars 46h, preparation for the seminars 34h, demonstrations 10h, practical work as a group project 70h, final exam 3h and preparation for the exam 24h. The project work is flexible and enables realization of student-initiated project ideas.

Target group:

Mechanical engineering students in their Master's studies, 5th year.

Recommended optional programme components:

Production technology studies in general.

Recommended or required reading:

Course notes (mainly in Finnish), contemporary articles. References: Ion, J.C. Laser Processing of Engineering Material, Elsevier 2005. Steen, W.K. Laser Material Processing, Springer 2003.

Assessment methods and criteria:

Final exam. The final grade is based on the combined points from the exam (0.4), seminar and practical work (0.6).

Grading:

1 to 5, zero denotes failure to pass.

Person responsible:

Jyri Porter

Other information:

The course objective is to familiriaze students especially with methods for manufacturing parts used in mechanical engineering. Methods covered in the course are alternative or supplementary to traditional manufacturing methods.

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

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during period 1 and 2. It is recommended to complete the course at the 3rd autumn semester.

Learning outcomes:

Quality in Production is the supplementary course for the students graduating in the field of Functions of Management in Industry. The aim of this course is to understand the effects of a comprehensive quality control on the functions and costs of an enterprise and the principles of realization of quality assurance
Learning Outcomes: Upon completion of the course, the student is able to specify the concept of quality, explain the quality control in different phases of production and explain how it is possible to realize quality assurance by using different methods and principles of quality assurance. In addition, the student is able to explain the principle of quality system and to plan the quality system according to the requirements of quality standards. The student can explain the use of measuring instruments needed in workshop quality assurance.

Contents:

Concept of quality; TQC managing philosophy; Quality control in different phases of production; Quality costs; Methods of quality assurance; Quality system of a company; Quality policy in subcontracting; Quality circles.;SFS-ISO 9000 quality standards.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

The course consists of lectures (20h), exercises (10h), practical work (30h) and shelf-study (73h).

Recommended or required reading:

Ishikawa, Kaoru; What is Total Quality Control? Prentice Hall, 1985; Ishikawa, K. Introduction to Quality Control, Chapman & Hall, London, 1990; Shingo, Shigeo; Zero Quality Control; Source Inspection and Poka-Yoke System, Productivity Press, 1986.

Assessment methods and criteria:

Final examination, the final grade is based on the combined points from the final exam (grade 0.7) and exercises (grade 0.3).

Grading:

Numerical grading scale 1-5.

Person responsible:

Heikki Pirkola

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

ECTS Credits:

5 cr / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during periods 3 and 4. It is recommended to complete the course at the 2nd spring semester.

Learning outcomes:

Upon completion of the course, the student will be able to explain the role of actuators in a typical machine automation system. The student is able to recognize various kinds of actuators and is able to classify them according to performance and usability. In addition to this, the student is able to design a simple hydraulic drive and is he/she is able to select a suitable actuator for a typical automation application. Furthermore, the student is able to assess actuator sensing needs and preconditions to work as a part of automation system.

Contents:

Basics actuators; Basics of hydraulics, Pneumatics and electrical drives; Performance and efficiency of actuators; Hydraulic actuators; Pneumatic actuators; Electrical actuators.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 32 h / Group work 16 h / Self-study 85 h

Target group:

Bachelor's degree students of mechanical engineering

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. Other material is in the beginning of the course.

Assessment methods and criteria:

This course utilizes continuous assessment. The assessment can be based on learning diary, exercises, seminars and exam. The more detailed assessment criteria are available on the Noppa Study Portal.

Grading:

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

Person responsible:

University teacher Yrjö Louhisalmi

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

Opettajat: Pirkola, Heikki Juhani

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

ECTS Credits:

5 ects/135 hours of work

Language of instruction:

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

Timing:

Lectures and exercises take place during the spring periods III - IV.

Learning outcomes:

The objective of the course is to familiarize students with the fundamentals of the functions and manufacturing methods of an engineering workshop. In order to apply manufacturing technology, students must know the features of different alternatives and be able to make technically and economically correct choices and combinations. This course emphasizes practicality and a general view of production. After the course, the student is capable of explaining manufacturing functions and methods of an engineering workshop. He/she is able to select parts manufacturing methods, machining data, machine tools and tooling equipment. In addition he/she can evaluate the alternatives of production automation in manufacturing functions.

Contents:

Features of different machining methods and machine tools; Selection of a blank machining method and machine tool according to type of work piece, accuracy and volume of production; Costs and technological possibilities of different machining methods; A review of control techniques, programming, jigs and tools

Mode of delivery:

Face-to-face -teaching

Learning activities and teaching methods:

Lectures 40 h and exercises 55 h (10 h of guided teaching) are held during periods III and IV. The course will be passed with a final exam and exercises which need to be returned and accepted. The final grade is a combined result of exercises and a final exam.

Prerequisites and co-requisites:

463101A Introduction to Manufacturing Technology

Recommended or required reading:

Manufacturing, Engineering & Technology, Fifth Edition, by Serope Kalpakjian and Steven R. Schmid. ISBN 0-13-148965-8. © 2006 Pearson Education, Inc., Upper Saddle River, NJ. The additional material that is in English will be given distributed at the lectures.

Assessment methods and criteria:

Final exam. The final grade is based on the combined points from exercises (grading 0,4) and the finai exam (grading 0,6).

Grading:

Numerical grading scale 1-5.

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

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.

Electives

521145A: Human-Computer Interaction, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Simo Hosio, Denzil Teixeira Ferreira
Opintokohteen kielet: English

ECTS Credits:
5 ECTS cr
Language of instruction:
In English.
Timing:
Autumn, period 2
Learning outcomes:
1. Knowledge of the Human Computer Interaction (HCI) fundamentals

2. Knowledge of evaluation techniques

3. Knowledge of prototyping techniques

4. Knowledge of 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:

While no specific courses are not required, elementary programming and design skills are desired.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time. The course involves some basic programming.

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 4 individual exercises throughout the semester: 1: Using questionnaires; 2: Grouping & clustering; 3: Fitts' law; 4: Advanced evaluation & visualisations. Passing criteria: all 4 exercises 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:

Denzil Ferreira

Working life cooperation:

-

Other information:

-

811312A: Data Structures and Algorithms, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
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 / 133 hours of work.

Language of instruction:

Finnish. One English exercise group will be arranged.

Timing:

The course is held in the autumn semester, during period 2. It is recommended to complete the course in the 2nd study year.

Learning outcomes:

After completing the course the student is able to - describe the concept of algorithm - explain correctness and time complexity of an algorithm - describe the complexity classes of the sorting algorithms presented - prove algorithm correctness - estimate the running time of an algorithm related to the size of the input - describe the data structures presented - argue how to choose a data structure or an algorithm to an application - apply basic graph algorithms - construct a program that applies appropriate data structures to solve a given problem

Contents:

1. Algorithms and their analysis 2. Search and sort algorithms and their time complexity 3. Basic data structures 4. Hash tables 5. Binary search trees 6. Graphs and their algorithms 7. Algorithm design paradigms

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 48h, exercises 21h, assignment (27), independent work 39h.

Target group:

BSc students.

Prerequisites and co-requisites:

811120P Discrete structures or similar knowledge. Basic skills in programming

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 and assignment.

Grading:

Numerical scale 1-5 or fail.

Person responsible:

Ari Vesanen

Working life cooperation:

No

521150A: Introduction to Internet, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

All materials are in English, lectures are given in Finnish.

Timing:

Spring, period 4.

Learning outcomes:

1. is able to explain the design principles, architecture, functionality and challenges of the public internet

2. understands data link layer's role and most important access network technologies

3. is able to explain the structure and most important protocols of the TCP/IP protocol stack

4. knows most important internet applications and their protocols

5. understands the principles of internet security and multimedia applications

6. is able to solve simple internet related problems

7. is able to program a small internet application

Contents:

Internet’s design principles and architecture, data link layer and most important access network technologies, TCP/IP protocol stack and its most important protocols, most important Internet applications, principles of Internet security and multimedia, internet's challenges and Future Internet.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 32 h / problem solving exercises 14 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, Information Processing Science students, other students of the University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

-

Recommended or required reading:

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:

Dr. Timo Koskela.

Working life cooperation:

-

Other information:

-

811167P: Introduction to Information Systems Design, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
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 / 133 hours of work.

Language of instruction:

finnish

Timing:

The course is held in the spring semester, during period 3. It is recommended to complete the course in the 2nd spring semester.

The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st study year.

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 27 h, exercises 21 h, assignment 85 h, exam 3 h.

Lectures (27h), Exercises (21h), Assignment (85h), Exam (3h).

Target group:

BSc students.

Recommended or required reading:

Satzinger, Jackson ja Burd (2007), Systems Analysis and Design in a Changing World. Hoffer, George and Valacich (2008), Modern systems Analysis and Design, 5. painos.

Assessment methods and criteria:

Exam and mandatory assignment.

Grading:

Numerical scale 1-5 or fail.

Person responsible:

Mikko Rajanen

521286A: Computer Systems, 8 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Teemu Leppänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

521142A Embedded Systems Programming 5.0 op

ECTS Credits:

8 ECTS cr

Language of instruction:

Lecturing in Finnish, course and exercise material available in English.

Timing:

Autumn, periods 1-2.

Learning outcomes:

After completing the course
Student understands the basic computer architecture and organization.
Student understands CPU operation and basic datapath operation.
Student knows different 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 is able to implement small assembly language programs.
Student recognizes how embedded systems programming is different from programming general-purpose computers.

Contents:

Overview of computer architecture and organization, CPU and datapath, memory hierarchies, data types, interrupts, registers and I/O, basics of the C programming language and basics of assembly language. Embedded systems programming.

Mode of delivery:

Web-based and face-to-face teaching.

Learning activities and teaching methods:

Lectures (36h), course exercises (10-20h), laboratory exercise (3h) and two course projects, one is completed in a group and the other alone.

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 and exercise material are available in the course website. Literature:
Bryant & O'Hallaron, Computer Systems: A Programmer's Perspective, 3rd Edition, Chapters 1-9.
Patterson & Hennessy, Computer Organization and Design: The Hardware/Software Interface, 5th Edition, Chapters 1-2, 4-5.

Assessment methods and criteria:

The assessment criteria is based on the learning outcomes of the course. Students complete the course exercises, participate to the laboratory exercise and complete the course projects. Assessment is based on the exercises and the course projects. More detailed information on assessment is published in the lecture material.
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

Working life cooperation:

Visiting lectures with experts from local industry are possible.

Other information:

-

521457A: Software Engineering, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

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, period 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, 4. software testing methods and strategies, 5. introduction to object-oriented analysis and design. 6. Agile software development.

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:

-

Other information:

-

811379A: Basics of Human Computer Interaction, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

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 student's work

Language of instruction:

Finnish

Timing:

2nd year, period 3, bachelor level.

Learning outcomes:

Upon completion of the course, the student will be able to define basic concepts of user interface design, introduce basic design process with design and evaluation methods and tasks, and apply graphical user interface design from the viewpoint of a certain user group and system.

Contents:

Basic concepts of user interface design and usability evaluation; user-centred design process; gathering of user data, analysis, expert evaluation and design by prototyping, user-based evaluation; universal design and user support; user interface description.

Mode of delivery:

Face-to-face teaching, self-study.

Learning activities and teaching methods:

Lectures (20 h), guided group assignment tasks in exercises (21 h) and without guidance in assignment groups (58 h); seminar (3h) individual tasks (31 h).

Target group:

2nd year, bachelor level students.

Prerequisites and co-requisites:

Humans as Users and Developers of Information Technology (811177P) -course or related knowledge.

Recommended optional programme components:

Recommended or required reading:

Dix et al. (2004, third or later edition) *Human-Computer Interaction* and lecture and assignment materials.

Assessment methods and criteria:

During the course, the students will be compiling the group assignments and integration tasks on their implementation. These will be assessed based on the learning outcomes of the course. The assessment criteria and the requirements will be explained in detail during the opening lecture of the course.

Grading:

1–5, fail

Person responsible:

Netta Iivari

Working life cooperation:

No

811395A: Basics of Databases, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Iisakka, Juha Veikko
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish. If at least four non-Finnish students take the course, an English exercise group will be organised.

Timing:

The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st spring semester.

Learning outcomes:

In addition, they have knowledge of modern non-relational database solutions (such as data warehouses and NoSQL-databases) and they have
commanding knowledge of making use of those non-relational databases (such as data mining and Big data techniques).

Contents:

Conceptual modelling (ER- and EER-diagrams), relational model (theory, databases, query techniques and normalization), transactions.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 45 h (in Finnish), compulsory exercises 24 h, reading 20 h, exams 21 h and self-studying 23 h

Target group:

Bachelor students

Prerequisites and co-requisites:

The student knows basics of programming.

Recommended or required reading:

Silberschatz, Korth & Sudarshan: Database system concepts. Elmasri & Navathe: Fundamentals 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:

fail, 1-5

Person responsible:
Juha Iisakka

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

Electives

477013P: Introduction to Process and Environmental Engineering, 5 op

Voimassaolo: 01.12.2016 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Eetu-Pekka Heikkinen
Opintokohteen kielet: Finnish

ECTS Credits:
5 cr / 135 hours of work.

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during periods I and II. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. unit operations, material management, phenomenon-based considerations, automation, energy and environment) 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. Unit operations. 2. Material balances. 3. Phenomenon-based considerations. 4. Material transport. 5. Process control and automation. 6. Principles in use, planning and protection of water and land resources: primary production, municipalities and industry. 7. Energy systems. 8. Productive activity as a part of society.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Pair exercises and contact-education that supports these exercises. 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 courses www-site.

Assessment methods and criteria:

Pair exercises. Please note that the course is not organised in English.

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:

-

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.

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P	General and Inorganic Chemistry A	5.0 op
780109P	Basic Principles in Chemistry	4.0 op

ECTS Credits:

5 credits/134 hours of work

Language of instruction:

Finnish

Timing:

1st autumn

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory. Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Lecturer Minna Tiainen

Working life cooperation:

No

Other information:

No

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:

Spring periods 3 and 4.

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:

Finnish

Timing:

The course is held in the autumn semester, during period II. It is recommended to complete the course at the 2nd autumn semester.

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. 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. It is also available via courses www-site.

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.

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:

-

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

Opettajat: Hiltunen, Jukka Antero

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 2

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

Opettajat: Ainassaari, Kaisu Maritta

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.

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:

The course 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 4 intermediate exams. The course can also be completed by final examination.

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 the 2nd period. 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

Opettajat: Ainassaari, Kaisu Maritta, Anna-Kaisa Ronkanen

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.

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:

The course 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 Kaisu Ainassaari

Working life cooperation:

No

Other information:

-

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

Electives

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

ECTS Credits:

5 ects / 133 hours of studying work.

Language of instruction:

Finnish, can be completed in English as a book examination

Timing:

Lectures, Autumn periods 1.-2. Exercises, periods 1. - 2. , and practical work, period 2.

Learning outcomes:

The aim of the course is to teach students to read and to draw machine
drawings and to carry out standard specifications of description methods,
legends and dimensioning. Students also learn how to use the computer system for modeling and drafting machine parts and assemblies.

Contents:

Purpose of machine drawing; Description and dimensioning of parts; Design
and viewpoints of manufacturing; Specifications of welds and surface roughness and tolerances on drawings; Principles of diagrammatic drawings. Machine parts and assemply modeling and making drawings with computer aided design software.

Mode of delivery:

Face-to-face

Learning activities and teaching methods:

Lectures 30 h / exercises 30 h / computer aided design exercises 20 h / practical work 53 h. Drawing and Modeling exercises will be group exercises and practical work will be individual.

Target group:

1st year mechanical engineering students

Recommended or required reading:

Pere, A.: Koneenpiirustus1 & 2, Kirpe Oy, Espoo. Other literature will be informed on lectures.

Assessment methods and criteria:

Final exam 60%, exercises 30% and practical work 30% of the final grade.

Grading:

Numerical grading scale 1-5 / fail

Person responsible:

University lecturer Tapio Korpela

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

ECTS Credits:

5 ETCS / 149 hours of work

Language of instruction:

Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.

Timing:

The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

After the course, the student can calculate forces and moments of loaded structures using equations of vector algebra and trigonometry. He/she can draw a free body diagram of the force system and then solve the unknown forces by using equations of equilibrium. He/she can determine resultants from uniformly distributed loads and apply Coulomb's law of friction in the problem equilibrium. The student can solve problems of internal and external forces of particle systems and rigid body systems in case of static equilibrium. Especially, he/she can draw shear force and bending moment diagrams for beam structures.

Contents:

Fundamental laws and concepts in statics. Force systems and their treatment. Equilibrium of particles and rigid bodies. Static forces in isostatic structures such as beams, frames, cables and trusses. Friction.

Mode of delivery:

Implemented as Face-to-face -teaching.

Learning activities and teaching methods:

Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:

Compulsory for candidate degree students of mechanical engineering programme.

Prerequisites and co-requisites:

Now prerequisites 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:

Salmi, T.: Statiikka, Pressus Oy, Tampere 2005; Beer, F., Johnston, R.: Vector Mechanics for Engineers, Statics, McGraw-Hill Book Company, 1996.

Assessment methods and criteria:

In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

Grading:

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

Person responsible:

University teacher Hannu Lahtinen

Other information:

The course gives ability for understanding static equilibrium, ability for determining force balance in structures and readiness for later studies.

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

ECTS Credits:

5 ETCS / 149 hours of work

Language of instruction:

Lectures in Finnish, foreign students follow the course by reading independently the books in English and taking part to the exercises and exams where all material is given in English.

Timing:

The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 1st spring semester.

Learning outcomes:

After the course, the student can determine stresses and strains of structures under loading. He/she can change the general stress and strain states from one coordinate system to another and can also apply constitutive equations in calculations. The student can dimension typical structures such as tension and compression bars, torsion bars and straight beams.

Contents:

Purpose and goals of strength of materials. Experimental elastic properties and strength of steel. Tension and compression of straight bars. Round torsion bar under shear force and torsion loads. Stresses and deflection curves in straight beams under bending moments. Stress state, strain state and constitutive equations, principal stresses, Mohr's circle. Stress hypotheses.

Mode of delivery:

Implemented as Face-to-face -teaching.

Learning activities and teaching methods:

Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:

Compulsory for Bachelor's degree students of mechanical engineering programme.

Prerequisites and co-requisites:

The recommended preceding course is 461102A Statics.

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:

Salmi, T., Pajunen, S.: Lujuusoppi, Pressus Oy, Tampere, 2010, Pennala, E.: Lujuusopin perusteet, Moniste 407, Otatieto 2002; Karhunen, J. & al.: Lujuusoppi, Otatieto 2004; Beer, F., Johnston, E., Mechanics of materials , McGraw-Hill, 2011; Gere, J.M., Timoshenko, S.P., Mechanics of Materials, Chapman&Hall, 1991.

Assessment methods and criteria:

In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

Grading:

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

Person responsible:

University teacher Hannu Lahtinen

Other information:

The course looks into the most important principal concepts of strenght of materials and gives ability for dimensioning of simple structures such as straight bars in tension, compression or torsion loads and straight beams under bending moments.

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

ECTS Credits:

5 ECTS credits / 132 hours of work

Language of instruction:

Finnish

Timing:

Spring, periods 3-4

Learning outcomes:

After completing the course students can describe the construction process, different parties of a construction project and their role in the project. Students can also explain how laws and legislation affects the construction, design and production of building structures. They can describe the material properties of the most common construction materials. They can also explain the certification process of a building material or product and the environmental legislation in construction.

Contents:

The following topics are covered during the course: Construction law and legislation. Different phases of a construction project. The raw materials, production and properties of the most common construction materials and products. Quality assurance and certification of building products. Environmental declarations. Life cycle assessment.

Mode of delivery:

Lecture room teaching.

Learning activities and teaching methods:

Lectures and exercises

Target group:

Students studying structural engineering

Recommended or required reading:

Lecture material. Land use and building legislation. The National Building Code of Finland

Assessment methods and criteria:

Passed practical works and exam

Grading:

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

Person responsible:

University teacher Hannu Liedes

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

ECTS Credits:

5 ECTS credits / 132 hours of work

Language of instruction:

Finnish

Timing:

Autumn semester, periods 1-2

Learning outcomes:

After completing the course the student is able to name technical regulations and instructions, which guide construction. After completing the course students can explicate principle of verifications and plastic theory on structure design and also different loads on structure. Student estimate design loads by calculation and design load effect in structures. Student can describe different structure and bracing systems.

Contents:

Regulations and supervising. The principle of design verification. The loads and effect. The principle of using of eurocode. The principle of plastic theory on on structure design. Structure systems. The joints of structures.

Mode of delivery:

Lecture room teaching.

Learning activities and teaching methods:

Lectures and exercises

Target group:

Students studying structural engineering

Prerequisites and co-requisites:

461016A Statics and 460101A Strength of Materials I

Recommended or required reading:

Lecture notes (mainly in Finnish), Finnish law and legislation, National building code of Finland, Eurocode standards

Assessment methods and criteria:

Passed practical works and exam

Grading:

Numerical grading scale 1-5. Grade 0 stands for a fail.

Person responsible:

University teacher Hannu Liedes

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

Opettajat: Rauno Heikkilä

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

ECTS Credits:

5 ECTS credits / 132 hours of work

Language of instruction:

Finnish

Timing:

Autumn, period 2

Learning outcomes:

The student know the role of the construction sector in national economy. He can classify life cycle stages in construction, he know cost steering methods, production planning and tasks in a construction site control. The student know sources of data for cost control and can estimate a bid in tendering. Profitability of investments can be assessed and financial aspects in energy and LCC calculations can be carried out. Financing calculations with rental cost assessment will be studied. The student know principles of contract administration and contract types and can explain the actions of contractors and construction managers in construction projects. The student will become acquainted with some features of human resource management, business management and production management. The student can plan general time- table, building site plan, work package plan and week schedule in construction. Procurement and machinery plan include the course.

Contents:

The effects of construction sector in the society. Public administration and regulation in construction sector. Life cycle, cost engineering and cost control in construction project. Design guidance and control budget. Implementation and building contract forms. Introduction to project management, critical path networks and arrow networks, schedules. Cost estimates and investment calculations. Bids, energy calculations, building maintenance and ecology in building. Construction activities, site planning and planning periods. Control budget. Safety and health and quality assurance. Basic functions in a construction enterprise. General conditions in contracts, agreements. Procurements, Lean in construction. Labor law. Enterprise cases and software applications.

Mode of delivery:

Lecture room teaching.

Learning activities and teaching methods:

Lectures 24 h /exercises 47 h independently or in groups self-study and exams 65 h. Total 136 h/5 ECTS credits.

Target group:

Bachelor level students

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:

Educational handouts and materials, Educational materials in information network, Recommended literature:
Finnish literature, see adjacent text
Reference literature: Barrie, Donald. S. & Paulson , Boyd C. 1992 or newer. Professional Construction Management.New York. McGraw-Hill.inc. pp.1-55. Part 1. Construction industry and practice, pp 252-306. Planning and Control of Operatios and Resources. (577. p.).; Ashworth, Allan, 1999(or newer). Cost Studies of Building. Addison Wesley Longman Ltd, Chapters 18-19. pp.330-382 Life-cycle costing 1-2. ja Chapter 17. pp. 383-395. Value management. Chapt.11. pp. 213-243 : Development appraisal. Ashworth Allan& Hogg, Keith.2000. Added Value in Design and Construction. Longman. Pearson education. 154 p; Jeffrey K.Liker.2001. The Toyota Way. McGraw-Hill. 330 p.; Information in Network. www. rakennustieto.fi. RATU, RT, KH.KONERATU. Http://www. rakennustieto.fi/index/tuotteet/ratu.html. Kirjautuminen.
http://www.rakennustieto.fi/index/tuotteet/rt.html; Quality in Network
http://www.qualitygurus.com/gurus/list-of-gurus/jeffrey-k-liker/; Crainer Stuart. 1998. The Ultimate Business Guru Book.Capsone.Oxford. 314 p.

Assessment methods and criteria:

Examination and accepted home work assignments.

Grading:

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

Person responsible:

professor Rauno Heikkilä

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: Filip Fedorik

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

ECTS Credits:

5 ECTS credits / 132 hours of work

Language of instruction:

Finnish

Timing:

Autumn, Periods 1-2

Learning outcomes:

After completing the course the student can explain basic phenomenon of building physics. The student can analyse and describe heat, air and moisture transfer in buildings and also explain main causes of typical moisture damages. The student can explain factors affecting energy efficiency and can calculate the energy efficiency number. The student knows the calculation methods in acoustics.

Contents:

Thermal isolation design. Determination of structure temperature. Moisture transfer and moisture exiting. Airflows in structures. Energy efficiency in buildings. Acoustic design.

Mode of delivery:

Face-to-face and distance learning

Learning activities and teaching methods:

Lectures, excercises, case studies, and self directed learning

Target group:

Students studying structural engineering

Prerequisites and co-requisites:

466101A Introduction to building construction

Recommended or required reading:

The material that is in English will be distributed at the lectures 1) Lecture notes (mainly in Finnish) 2) Suomen rakentamismääräyskokoelman osat
C1, C2, C3, C4 ja D3. 3) Introduction to Building Physics, Hagentoft, C.-E. (2001), ISBN 91-44-01896-7, (As specified in lectures).

Assessment methods and criteria:

Excercises and exam

Grading:

Numerical grading scale 1-5. Grade 0 stands for a fail.

Person responsible:

Raimo Hannila

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.

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

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.

Electives

521077P: Introduction to Electronics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP

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 ECTS credits / 132,5 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the 1st period. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

1. Student understands the block structures of electronic devices and their signal processing paths.

2. Student can identify the interfaces of analog and digital electronics and the software operations.

3. Student is able to identify and classify electronics components and compare their properties.

4. Students can describe electric conductivity and apply the phenomenon on designing and choosing resistors

5. Student is able to estimate the difference between dielectric materials and how they affect the properties of a capacitor.

6. Student can compare properties of magnetic materials and how identify they effect on inductive components.

7. Student can identify semiconductivity and is able to list typical semiconductor components.

8. Student can classify different circuit board techniques and is able to choose proper coupling techniques.

9. 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:

Face-to-face teaching and independent work.

Learning activities and teaching methods:

The implementation methods of the course vary. The course will be arranged utilizing activating teaching methods agreed on together with the students. There will be 48 hours of guided teaching events and 84.5 hours of teaching without guidance either privately or in a group.

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:

This course utilizes continuous assessment. During the course, there are two intermediate exams. In addition students will make course work which are graded. The assessment of the course is based on the learning outcomes of the course. 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:

Jari Hannu

Working life cooperation:

No

Other information:

-

521109A: Electrical Measurement Principles, 5 op

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

ECTS Credits:

5 ECTS credits / 136h

Language of instruction:

Course is lectured in Finnish. Lecture notes are available in English. Laboratory exercises and the exam can be done in English.

Timing:

Periods 1-2.

Learning outcomes:

1. is able to measure basic measurements with a multimeter,

2. is able to measure basic measurements with an oscilloscope,

3. is able to operate signal and function generators.

4. is able to 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. Course is open for all students in University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

None.

Recommended or required reading:

Course material is in English and Finnish and can be found in Optima.

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:

-

521301A: Digital Techniques 1, 8 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
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:

1. 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.
2. 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.
3. Based on this knowledge, students are able to implement and analyze digital devices consisting of ordinary simple digital components.
4. 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, weekly home assignments.

Target group:

Primarily 1st year electrical engineering and computer science and engineering BSc students. The course can be taken by the students of the university of Oulu.

Prerequisites and co-requisites:

-

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:

Text books, MIT OpenCourseWare and execise literature.

Assessment methods and criteria:

Project work and home assignments
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Project work and home assignments are assessed on numerical scale 1-5. The average of project work and home assignments will be the final grade.

Person responsible:

Antti Mäntyniemi

Working life cooperation:

-

Other information:

-

521302A: Circuit Theory 1, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
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

1. write and solve the equations describing the operation of a given electrical circuit

2. solve the sinusoidal steady-state solution using complex phasor arithmetics

3. solve time responses of electric circuits

4. simplify electrical circuits e.g. using equivalent circuits

5. 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, 22h exercises, and a simulation exercise.

Target group:

Finnish BSc students.

Prerequisites and co-requisites:

Matrix algebra, complex arithmetics, differential equations.

Recommended optional programme components:

Background to all analog electronics cources.

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:

-

031077P: Complex analysis, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Ruotsalainen Keijo
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay031077P	Complex analysis (OPEN UNI)	5.0 op
031018P	Complex Analysis	4.0 op

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

Fall semester, period 1.

Learning outcomes:

After completing the course the student

1. is able to calculate the derivative and the integral of functions of complex variable,
2. understands the concept of analyticity

3. is capable of calculating the contour integrals and using the theory of residues for computing the line integrals, will be able to apply the techniques of complex analysis to simple problems in signal processing.

Contents:

Complex numbers and functions, complex derivative and analyticity, complex series, Cauchy's integral theorem, Laurent and Taylor expansions, theory of residues, applications to signal analysis.

Mode of delivery:

Face-toface teaching, Stack(web-based too) exercises.

Learning activities and teaching methods:

Lectures 28 h/Exercises 14 h/Self study 93 h.

Target group:

The students in the engineering sciences. The other students are welcome, too.

Prerequisites and co-requisites:

The recommended prerequisite is the completion of the courses Calculus I and II, Differential Equations.

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:

The lecture notes

Assessment methods and criteria:

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

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Jukka Kemppainen

Working life cooperation:

-

Other information:

-

521104P: Introduction to Material Physics, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Hagberg
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 132,5 hours of work

Language of instruction:

Finnish.

Timing:

Autumn semester period 1

Learning outcomes:

1. is able to explain the principal solid state crystal structures

2. can explain how propagating waves and electrons in a crystal lattice can be presented

3. 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

4. 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:

Will be notified in the beginning of lectures

Learning activities and teaching methods:

Will be notified in the beginning of lectures

Target group:

Second year electrical engineering students

Prerequisites and co-requisites:

Basic physics and mathematics.

Recommended optional programme components:

Basic course for 521071A Principles of Semiconductor Devices.

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:

Will be notified in the beginning of lectures. Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Juha Hagberg

Working life cooperation:

No

Other information:

-

521303A: Circuit Theory 2, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
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:

Autumn, period 2

Learning outcomes:

After the course the student can:
1. use Laplace transform for solving time and frequency response of electric circuits;
2. derive continuous-time transfer functions.;
3. solve their poles and zeros and understand the meaning of those;
4. draw the pole-zero map and Bode plots of any given transfer function;
5. 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:

Continuation for Circuit theory 1. Needed in most analog electronics courses.

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:

-

521287A: Introduction to Computer Systems, 5 op

Voimassaolo: 01.08.2016 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Leppänen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay521287A	Introduction to Computer Systems (OPEN UNI)	5.0 op
521142A	Embedded Systems Programming	5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Lecturing in Finnish, course and exercise material available in English.

Timing:

Autumn, periods 1-2.

Learning outcomes:

Upon completing the course, the student understands the basics of computer architecture and CPU operation.
Student knows number systems and data representations in computer.
Student is familiar of I/O operation with peripheral devices.
Student is able to implement small programs with the C programming language for workstations and embedded systems.
Student recognizes how embedded systems programming is different from programming general-purpose computers.

Contents:

Overview of computer architecture and CPU, data types and memory management, interrupts, registers and I/O, general computer and embedded systems programming, basics of the C programming language.

Mode of delivery:

Web-based teaching + face-to-face teaching.

Learning activities and teaching methods:

Lectures (20h), course exercises (10-20h), laboratory exercise (3h) and course project in a group.

Target group:

Students of the University of Oulu

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 and exercise material are available in the course website. For English speaking students, either of the following material may be useful:
Patterson & Hennessy, Computer Organization and Design: The Hardware/Software Interface, 5th Edition, Chapter 1.
Bryant & O'Hallaron, Computer Systems: A Programmer's Perspective, 3rd Edition, Chapter 1.

Assessment methods and criteria:

The assessment criteria is based on the learning outcomes of the course. Students complete the course exercises, participate to the laboratory exercise and complete the course project in a group. Assessment is based on the exercises and the course project. More detailed information on assessment is published in the lecture material.
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

Working life cooperation:

Visiting lectures with experts from local industry are possible.

Other information:

This course replaces the course 521142A Embedded systems programming.

521337A: Digital Filters, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Olli Silven

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay521337A Digital Filters (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish, English study material available

Timing:

Spring, period 3.

Learning outcomes:

1. Student is able to specify and design respective frequency selective FIR and IIR filters using the most common methods.

2. Student is able to solve for the impulse and frequency responses of FIR and IIR filters given as difference equations, transfer functions, or realization diagrams, and can present analyses of the aliasing and imaging effects based on the responses of the f

3. Student is able to explain the impacts of finite word length in filter design.

4. Student has the necessary basic skills to use signal processing tools available in Matlab environment and to judge the results.

Contents:

1. Sampling theorem, aliasing and imaging, 2. Discrete Fourier transform, 3. Z-transform and frequency response, 4. Correlation and convolution, 5. Digital filter design, 6. FIR filter design and realizations, 7. IIR filter design and realizations, 8. Finite word length effects and analysis, 9. Multi-rate signal processing.

Mode of delivery:

Face-to-face teaching (Lectures), independent work, group work

Learning activities and teaching methods:

Lectures and exercises 50 h. The design exercises familiarize the students with the methods of digital signal processing using the Matlab software package. The rest as independent work.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

031077P Complex Analysis, 031080A Signal Analysis

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 and exercise materials. Material is in Finnish and in English. Course book: Ifeachor, E., Jervis, B.: Digital Signal Processing, A Practical Approach, Second Edition, Prentice Hall, 2002.

Assessment methods and criteria:

The course can be passed either with week exams or a final exam. In addition, the exercises need to be returned and accepted.
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:

Olli Silven

Working life cooperation:

None.

Other information:

-

521431A: Principles of Electronics Design, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Kostamovaara
Opintokohteen kielet: Finnish

ECTS Credits:

5

Language of instruction:

Finnish.

Timing:

Spring, period 3

Learning outcomes:

1. 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:

Students of Electrical engineering. Other students of the University of Oulu may also participate.

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:
-

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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

521160P: Introduction to Artificial Intelligence, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Olli Silven
Opintokohteen kielet: English
Leikkaavuudet:

ay521160P	Introduction to Artificial Intelligence (OPEN UNIV)	5.0 op

ECTS Credits:

5 ECTS credits /135 hours of work

Language of instruction:

The language of instruction is Finnish with part of the material in English. The course is implemented as exercises done by groups of participants.

Timing:

The course is held during the period IV in the Spring semester, and it is recommended for the 1st or 2nd year.

Learning outcomes:

Upon completion the student the student will have the elementary skills to identify the potentially applicable artificial intelligence techniques for solving problems. He/she is able to recognize search, regression, classification, and clustering problems, and to explain the use of supervised and nonsupervised learning, performance measurements and metrics.

Contents:

1. Introduction: the role of artificial intelligence
2. Search methods: artificial intelligence in games
3. Regression methods: learning of causalities
4. Classication methods: recognition of categories
5. Clustering methods: identification of category structure
6. Supervised learning
7. Unsupervised learning

Mode of delivery:

The course is implemented face-to-face teaching

Learning activities and teaching methods:

Lectures 42h / group work 70 h / elf-study 23 h. The exercises are completed as group work in multi-disciplinary teams.

Target group:

The course is suitable for all students, but due to the nature of the exercises some elementary programming skills are needed in each student group.

Prerequisites and co-requisites:

No prerequisites

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:

The course is modeled loosely based on the University of Washington's Coursera module "Machine learning foundations: a case study approach"

Assessment methods and criteria:

The course utilizes continuous assesment. During the course there are 6 intermediate exams of which 5 best ones will be used in final evaluation. The course includes 5 group exercises of which at least 4 need to be passed.
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:

Olli Silvén

Working life cooperation:

The course includes guest presentations on the artificial intelligence applications

Other information:

-

521287A: Introduction to Computer Systems, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Teemu Leppänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay521287A Introduction to Computer Systems (OPEN UNI) 5.0 op

521142A Embedded Systems Programming 5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Lecturing in Finnish, course and exercise material available in English.

Timing:

Autumn, periods 1-2.

Learning outcomes:

Upon completing the course, the student understands the basics of computer architecture and CPU operation.
Student knows number systems and data representations in computer.
Student is familiar of I/O operation with peripheral devices.
Student is able to implement small programs with the C programming language for workstations and embedded systems.
Student recognizes how embedded systems programming is different from programming general-purpose computers.

Contents:

Overview of computer architecture and CPU, data types and memory management, interrupts, registers and I/O, general computer and embedded systems programming, basics of the C programming language.

Mode of delivery:

Web-based teaching + face-to-face teaching.

Learning activities and teaching methods:

Lectures (20h), course exercises (10-20h), laboratory exercise (3h) and course project in a group.

Target group:

Students of the University of Oulu

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 and exercise material are available in the course website. For English speaking students, either of the following material may be useful:
Patterson & Hennessy, Computer Organization and Design: The Hardware/Software Interface, 5th Edition, Chapter 1.
Bryant & O'Hallaron, Computer Systems: A Programmer's Perspective, 3rd Edition, Chapter 1.

Assessment methods and criteria:

The assessment criteria is based on the learning outcomes of the course. Students complete the course exercises, participate to the laboratory exercise and complete the course project in a group. Assessment is based on the exercises and the course project. More detailed information on assessment is published in the lecture material.
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

Working life cooperation:

Visiting lectures with experts from local industry are possible.

Other information:

This course replaces the course 521142A Embedded systems programming.

Electives

521145A: Human-Computer Interaction, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Simo Hosio, Denzil Teixeira Ferreira
Opintokohteen kielet: English

ECTS Credits:

5 ECTS cr

Language of instruction:

In English.

Timing:

Autumn, period 2

Learning outcomes:

1. Knowledge of the Human Computer Interaction (HCI) fundamentals

2. Knowledge of evaluation techniques

3. Knowledge of prototyping techniques

4. Knowledge of 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:

While no specific courses are not required, elementary programming and design skills are desired.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time. The course involves some basic programming.

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 4 individual exercises throughout the semester: 1: Using questionnaires; 2: Grouping & clustering; 3: Fitts' law; 4: Advanced evaluation & visualisations. Passing criteria: all 4 exercises 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:

Denzil Ferreira

Working life cooperation:

-

Other information:

-

521150A: Introduction to Internet, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

All materials are in English, lectures are given in Finnish.

Timing:

Spring, period 4.

Learning outcomes:

1. is able to explain the design principles, architecture, functionality and challenges of the public internet

2. understands data link layer's role and most important access network technologies

3. is able to explain the structure and most important protocols of the TCP/IP protocol stack

4. knows most important internet applications and their protocols

5. understands the principles of internet security and multimedia applications

6. is able to solve simple internet related problems

7. is able to program a small internet application

Contents:

Internet’s design principles and architecture, data link layer and most important access network technologies, TCP/IP protocol stack and its most important protocols, most important Internet applications, principles of Internet security and multimedia, internet's challenges and Future Internet.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 32 h / problem solving exercises 14 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, Information Processing Science students, other students of the University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

-

Recommended or required reading:

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:

Dr. Timo Koskela.

Working life cooperation:

-

Other information:

-

521151A: Applied Computing Project I, 10 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English
Leikkaavuudet:

521041A	Applied Computing Project I	8.0 op

ECTS Credits:

10 ECTS cr

Language of instruction:

In English.

Timing:

Autumn and spring, periods 1-4.

Learning outcomes:

1. has basic understanding on how to collaboratively design a small-scale software project,

2. has basic understanding on how to implement and evaluate a small-scale software project,

3. is able to extensively document a small-scale software project,

4. is able to present and "pitch" a project work, i.e. give a good, concise presentation of the work

Contents:

Project work that is typically executed in groups of 3-5 students. Note: the project work cannot be done alone.

Mode of delivery:

3-4 lectures to introduce and conclude the course and project works, collaborative project work for a "client" (teaching assistants and/or industry representatives)

Learning activities and teaching methods:

Practical work in project teams. The course is passed with an approved project work. The implementation is fully in English.

Target group:

3rd year Computer Science and Engineering B.Sc. students and other Students of the University of Oulu.

Prerequisites and co-requisites:

While no specific courses are not required, elementary programming and design skills are desired.

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:

For additional reading (not mandatory): Dix, Finlay, Abowd & Beale: Human-Computer Interaction (http://www.hcibook.com); Rogers, Sharp & Preece: Interaction Design: Beyond Human-Computer Interaction (http://www.id-book.com).

Assessment methods and criteria:

The course uses continuous assessment so that the project work is assessed in stages: design (20% of total grade), implementation (40%), evaluation (20%), and final report (20%). Passing criteria: all stages (design, implementation, evaluation, report) must be completed with an approved grade. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 1-5; zero stands for a fail.

Person responsible:

Matti Pouke, Denzil Ferreira

Working life cooperation:

No

Other information:

-

521157A: Introduction to Social Network Analysis, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mourad Oussalah

Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits / 120 hours of works

Language of instruction:

English

Timing:

Period 2. It is recommended to complete the course at the end of period 2

Learning outcomes:

Upon completing the course, the student is expected to i) understand social aspects of the web; ii) learn to
collect, clean and represent social media data; iii) quantify important properties of social media; iv) find
and analyze (online) communities; v) understand the diffusion process in social network; vi) familiarize with
simple modelling toolkits for social media analysis

Contents:

The course describes basics of social network analysis, allowing the students to understand structure and evolution of the network, while enabling them to use appropriate tools and techniques to draw inferences and discover hidden patterns from the network. The course is designed to accommodate computer science, mathematical and social science student background, which helps in emergence of
multi-disciplinary research in the university

Mode of delivery:

Face- to-face teaching and laboratory sessions

Learning activities and teaching methods:

Lectures (24 h), tutorial/laboratory sessions (10h), and practical work. The course is passed with an approved practical work and class test. The implementation is fully in English.

Target group:

Students with moderate logical reasoning skills

Prerequisites and co-requisites:

None

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. Zafarani, M. A. Abbasi, and H. Liu, Social Media Mining: An Introduction, Cambridge University Press, 2014

Assessment methods and criteria:

One class test (30%) in the middle of the term + Project work (70%)
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5

Person responsible:

Mourad Oussalah

Working life cooperation:

-

Other information:

We hope to attract students from humanties, economics and political in order to encourage multidisciplinary studies and enforce interesting student projects where each group contains at least one student from computer science and one from another faculty.

521159P: Principles of Digital Fabrication, 5 op

Voimassaolo: 01.01.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Georgi Georgiev

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay521159P Principles of Digital Fabrication (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits/ 135 hours of work

Language of instruction:

Finnish/English

Timing:

The course will be held in the spring semester, during period IV.

Learning outcomes:

In this course the students will learn the whole process of digital fabrication in FabLab. They will learn how to create an interactive 3D prototype, design mechanical parts for prototype, create basic electronics, implement a control logic for open hardware embedded board, and work in teams on project.

Contents:

The course teaches students to (1) design mechanical components with solid modeling tools, (2) build necessary electronics, and (3) implement software to a microcontroller, to create in FabLab a physical gadget that interacts with the world around it.

Mode of delivery:

Face-to-face teaching (Lectures)/ Individual work towards project

Learning activities and teaching methods:

Lectures 12h / Individual work 123h. There are sessions each week in FabLab where guidance is available.

Target group:

This course is included in the computer science bachelor degree program. It is also available for all degree programs in the university. The course is offered to high-school students.

Prerequisites and co-requisites:

-

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:

There is no recommended or required reading. The tutorials for tools and software (or links to such tutorials)
will be provided in the course.

Assessment methods and criteria:

The course will be evaluated on the basis of the project delivered by the teams of students. Essential part of this reporting is the documentation of the project.

Grading:

The course is evaluated pass/fail only

Person responsible:

Georgi Georgiev

Working life cooperation:

-

Other information:

The course is also offered to high-school students with special study right and gives 5 ECTS credits that can be included in some bachelor's degrees at University of Oulu.

521337A: Digital Filters, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Olli Silven

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay521337A Digital Filters (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish, English study material available

Timing:

Spring, period 3.

Learning outcomes:

1. Student is able to specify and design respective frequency selective FIR and IIR filters using the most common methods.

2. Student is able to solve for the impulse and frequency responses of FIR and IIR filters given as difference equations, transfer functions, or realization diagrams, and can present analyses of the aliasing and imaging effects based on the responses of the f

3. Student is able to explain the impacts of finite word length in filter design.

4. Student has the necessary basic skills to use signal processing tools available in Matlab environment and to judge the results.

Contents:

1. Sampling theorem, aliasing and imaging, 2. Discrete Fourier transform, 3. Z-transform and frequency response, 4. Correlation and convolution, 5. Digital filter design, 6. FIR filter design and realizations, 7. IIR filter design and realizations, 8. Finite word length effects and analysis, 9. Multi-rate signal processing.

Mode of delivery:

Face-to-face teaching (Lectures), independent work, group work

Learning activities and teaching methods:

Lectures and exercises 50 h. The design exercises familiarize the students with the methods of digital signal processing using the Matlab software package. The rest as independent work.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

031077P Complex Analysis, 031080A Signal Analysis

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 and exercise materials. Material is in Finnish and in English. Course book: Ifeachor, E., Jervis, B.: Digital Signal Processing, A Practical Approach, Second Edition, Prentice Hall, 2002.

Assessment methods and criteria:

The course can be passed either with week exams or a final exam. In addition, the exercises need to be returned and accepted.
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:

Olli Silven

Working life cooperation:

None.

Other information:

-

521467A: Digital Image Processing, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Heikkilä, Janne Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay521467A	Digital Image Processing (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Lectures in Finnish and exercises in English. Course can be passed in Finnish and English.

Timing:

Autumn, period 1.

Learning outcomes:

Upon completion of the course the student:
- understands the basic theory of digital image processing and knows its main applications,
- is able to apply spatial and frequency domain and wavelet based methods in image enhancement, restoration, compression and segmentation.

Contents:

1. Fundamentals of digital images, 2. Image enhancement in spatial and frequency domains, 3. Image restoration, 4. Color image processing, 5. Wavelets, 6. Image compression, 7. Morphological image processing and 8. Image segmentation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 24 h, exercises 14 h and homework assignments 30 h. The rest is independent 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:

In order to obtain deep understanding of the content, it is a benefit if the student has completed the mathematics courses in the computer science and engineering BSc program or otherwise has equivalent knowledge.

Recommended or required reading:

Gonzalez, R.C., Woods, R.E.: Digital Image Processing, Third Edition, Prentice-Hall, 2008, Chapters 1-10. Lecture notes and exercise

Assessment methods and criteria:

The course is completed by passing the exam and homework assignments.
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:

Janne Heikkilä

Working life cooperation:

None.

Other information:

-

521484A: Statistical Signal Processing, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

521348S	Statistical Signal Processing 1	5.0 op

ECTS Credits:

5

Language of instruction:

Finnish, Course can be passed in English.

Timing:

Spring, periods 4.

Learning outcomes:

1. is able to utilize the generic linear model as a representation for parameter estimation

2. can apply typical deterministic and random parameter estimation methods for different estimation problems

3. is able to determine statistical properties of estimators and make comparisons between them

4. can form a basic state-variable model and utilize Kalman filtering for state estimation

5. is able to apply basic methods of detection theory for solving simple detection problems

6. can implement the learned methods and assess their statistical properties with the Matlab software

Contents:

This course provides basic knowledge of statistical signal processing, in particular, estimation theory and its applications in signal processing. Topics: 1. Introduction, 2. Modeling of estimation problems, 3. Least Squares estimation, 4. BLUE-estimation, 5. Signal detection, 6. ML estimation, 7. MS estimation, 8. MAP estimation, 9. Kalman Filter.

Mode of delivery:

Face-to-face teaching and homework assignments.

Learning activities and teaching methods:

Lectures (24 h), exercises (24 h) and Matlab homework assignments (20 h).

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

031078P Matrix Algebra, 031021P Probability and Mathematical Statistics

Recommended optional programme components:

521337A Digital Filters, 031050A Signal Analysis. These courses provide complementary information on digital signal processing and stochastic signals. The courses are recommended to be studied either in advance or simultaneously.

Recommended or required reading:

J. Mendel: Lectures in estimation theory for signal processing, communications and control, Prentice-Hall, 1995. M.D. Srinath, P.K. Rajasekaran, R. Viswanathan: Introduction to Statistical Signal Processing with Applications, Prentice-Hall, 1996, Chapter 3. Lecture notes and exercise material.

Assessment methods and criteria:

The course is passed with intermediate exams or final exam and accepted Matlab 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:

Janne Heikkilä

Working life cooperation:

No.

521495A: Artificial Intelligence, 5 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Abdenour Hadid
Opintokohteen kielet: English
Leikkaavuudet:

ay521495A	Artificial Intellig (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Period 3.

Learning outcomes:

1. is able to identify the types of problems that can be solved using methods of artificial intelligence.
2. knows the basic concepts of intelligent agents, the common search methods used in artificial intelligence, logic based reasoning and applying planning techniques to problems of artificial intelligence.
3. can also apply simple methods to reasoning under uncertainty and machine learning from observation.
4. In addition the student will be able to implement the most common search methods.

Contents:

1) Introduction, 2) Rational (Intelligent) Agents and Uninformed Search, 3) Informed Search, 4) Programming Project 1 (Pacman 1), 5) Adversarial Search (Games), 6) Programming Project 2 (Pacman 2), 7) Uncertainty and Utilities, 8) Markov Decision Processes, 9) Reinforcement Learning, 10) Bayesian Networks, 11) Machine Learning (learning from Observation), 12) Advanced Applications, 13) Conclusions

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 hours of lectures and a programming exercise (approximately 25 hours) during period 3, the rest as independent work.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

Programming skills.

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:

The course material is based on the Artificial Intelligence course of Berkely University and the book "Artificial Intelligence, A Modern Approach" by Russell & Norvig.
1) http://ai.berkely.edu
2) Russell S., Norvig P.: Artificial Intelligence, A Modern Approach, Second Edition, Prentice Hall, 2003.

Assessment methods and criteria:

The course is passed with a final exam and a passed programming exercise.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / fail.

Person responsible:

Abdenour Hadid
Zinelabidine Boulkenafet

Working life cooperation:

-

Other information:

-

521453A: Operating Systems, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Röning

Opintokohteen kielet: English

Leikkaavuudet:

ay521453A Operating Systems (OPEN UNI) 5.0 op

ECTS Credits:

5

Language of instruction:

In Finnish, material available in English

Timing:

Spring, period 4

Learning outcomes:

1. is capable of explaining the basic structure and functioning of operating system

2. is able to point the problems related to process management and synchronization as well as is able to apply learned methods to solve basic problems

3. is capable of explaining the cause and effect related to deadlocks and is able to analyse them related to common circumstances in operating systems

4. is able to explain the basics of memory management, the use of virtual memory in modern operating systems as well as the structure of the most common file-systems.

Contents:

Operating system structure and services, process management, process synchronization, deadlocks, memory management, virtual memory, file-systems

Mode of delivery:

Face-to-face.

Learning activities and teaching methods:

Lectures 30 h, laboratory exercise 6 h, the rest as independent work. The laboratory work, including pre-exercise and guided exercise performed in a group of one or two students in the unix environment, covers core topics of the course.

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 and 521267A Computer Engineering

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 (in Finnish) and exercise material. Silberschatz A., Galvin P., and Gagne G.: Operating System Concepts, 6th edition (or newer), John Wiley & Sons, Inc., 2003. Chapters 1-12.

Assessment methods and criteria:

The course is passed the final examination and accepted laboratory working.
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:

-

Other information:

-

521457A: Software Engineering, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

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, period 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, 4. software testing methods and strategies, 5. introduction to object-oriented analysis and design. 6. Agile software development.

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:

-

Other information:

-

521275A: Embedded Software Project, 8 op

Voimassaolo: 01.08.2007 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Tokola
Opintokohteen kielet: English

ECTS Credits:

8

Language of instruction:

Material in English, lectures and guidance of individual groups available in English.

Timing:

Spring, periods 3-4.

Learning outcomes:

1. Can work independently on a non-trivial problem

2. Knows how to write a thesis and has gained lot of experience on refining text

3. Can make a scientific background study on a topic

4. Has increased experience on implementing an embedded software

5. Has improved group work and project skills

Contents:

This course familairizes the student with modern embedded system development with modern methods and tools. Topics: Development tools, practical application program for an embedded system. The students additionally work on the application topic through scientific papers and use their application program to produce a scientific work of their own.

Mode of delivery:

Face-to-face teaching, independent project work in groups.

Learning activities and teaching methods:

Pair project with monitoring meetings and a compulsory exercise. Lectures 30 h, design exercise in period 4-6 180 h.

Target group:

Computer Science and Engineering students and other Students of the University of Oulu.

Prerequisites and co-requisites:

521457A Software Engineering, 521286A Computer Systems or 521142A Embedded Systems Programming. In addition, 521453A Operating Systems be beneficial.

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:

Course website, hardware data sheets and manuals, scientific publications.

Assessment methods and criteria:

Project report and a demonstrated implementation.
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 Tokola

Working life cooperation:

The topics of the course are relevant research topics with applications in the industry, and visiting lecturers are occasionally arranged to shed light on how the course topics are applied in the industry.

Other information:

The 521275A course offers the possibility to complete your Bachelor thesis in a structured course environment. The course is suitable also for students who do not use the course for their Bachelor Thesis.

031023P: Mathematical Structures for Computer Science, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Applied Mathematics and Computational Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Matti Peltola

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031023P	Mathematical Structures for Computer Science (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn, during period 1. It is recommended to complete the course at the 2nd autumn semester.

Learning outcomes:

The student is able to apply result of logic to find the truth value of logical statement and can express sentences of natural language by symbols of logic.. He/She can use arithmetic operations on different number bases. The student recognize the main types of graphs and understand the basis concepts of graphs and is able to apply formal methods of discrete mathematics to model simple information processing problems.

Contents:

1. Elementary logic 2. Mathematical induction 3. Elementary number theory 4. Set theory 5. Elementary graph theory 6. Elementary theory of formal languages 7. Theory of automata and Turing machines

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h / Group work 14 h / Self-study 93 h.

Target group:

2. year students of computer science.

Prerequisites and co-requisites:

No prerequisites

Recommended optional programme components:

-

Recommended or required reading:

Recommented literature: Rosen K.H.: Discrete Mathematics and Its Applications. Gersting J.L.: Mathematical Structures for Computer Science.

Assessment methods and criteria:

The course can be completed by intermediate exams (2 exams) or by a final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail

Person responsible:

Matti Peltola

Working life cooperation:

-

Other information:

-

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

Electives

477013P: Introduction to Process and Environmental Engineering, 5 op

Voimassaolo: 01.12.2016 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Eetu-Pekka Heikkinen
Opintokohteen kielet: Finnish

ECTS Credits:

5 cr / 135 hours of work.

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during periods I and II. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

Students can examine industrial processes using the methods and perspectives of process and environmental engineering (e.g. unit operations, material management, phenomenon-based considerations, automation, energy and environment) 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. Unit operations. 2. Material balances. 3. Phenomenon-based considerations. 4. Material transport. 5. Process control and automation. 6. Principles in use, planning and protection of water and land resources: primary production, municipalities and industry. 7. Energy systems. 8. Productive activity as a part of society.

Mode of delivery:

Classroom education

Learning activities and teaching methods:

Pair exercises and contact-education that supports these exercises. 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 courses www-site.

Assessment methods and criteria:

Pair exercises. Please note that the course is not organised in English.

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:

-

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.

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

780117P	General and Inorganic Chemistry A	5.0 op
780109P	Basic Principles in Chemistry	4.0 op

ECTS Credits:

5 credits/134 hours of work

Language of instruction:

Finnish

Timing:

1st autumn

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory. Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Lecturer Minna Tiainen

Working life cooperation:

No

Other information:

No

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:

Spring periods 3 and 4.

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:

Finnish

Timing:

The course is held in the autumn semester, during period II. It is recommended to complete the course at the 2nd autumn semester.

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. 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. It is also available via courses www-site.

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.

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:

-

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

Opettajat: Hiltunen, Jukka Antero

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 2

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

Opettajat: Ainassaari, Kaisu Maritta

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.

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:

The course 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 4 intermediate exams. The course can also be completed by final examination.

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 the 2nd period. 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

Opettajat: Ainassaari, Kaisu Maritta, Anna-Kaisa Ronkanen

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.

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:

The course 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 Kaisu Ainassaari

Working life cooperation:

No

Other information:

-

555205M: Engineering studies in other Universities/Institutes, 0 - 30 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

Ei opintojaksokuvauksia.

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.

555206M: Elective studies in other Universities/Institutes, 0 - 30 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

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.

IEM electives

555214A: Working in the university community, 5 op

Voimassaolo: 01.01.2017 -

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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the university community (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support the university community and their own professional growth.

Target group:

Industrial Engineering and Management students.

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

The course can include several tasks as follows: Student Union 2 years 2 ECTS, University Board 1 year 2 ECTS, University Collegial Body 2 years 2 ECTS, Education Council 1 year 2 ECTS, Education Management Team 1 year 2 years, Faculty Management Team 1 year 2 ECTS, Faculty Board 2 years 2 ECTS, Faculty Education Council 2 years 2op, Student Union Board 1 year 1-3 ECTS, National Student Organisation 1 year 1-5 ECTS, Other major education policy and / or teaching development tasks 1-3 ECTS credits, Student Tutor or Teaching Assistant 2 ECTS cr.
The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555215A: Working life project, 5 op

Voimassaolo: 01.01.2017 -
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

Timing:

Periods 1-4

Learning outcomes:

Upon completion of the course, the student will be able to:

- apply the skills required for the tasks in the working life (communication, co-operation, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills)
- take responsibility for the tasks in a responsible manner
- analyse and find development targets related to the tasks

Contents:

Communication, collaboration, creativity, problem solving, project management, learning, technical skills, international skills, commercial and financial skills.

Mode of delivery:

The tuition will not be organised.

Learning activities and teaching methods:

Students complete tasks with their own activities to support their own professional growth.

Target group:

Industrial Engineering and Management students

Prerequisites and co-requisites:

555225P Basics of industrial engineering and management, 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management or similar knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Participation in a company project, competition or similar (e.g. Accenture innovation challenge, ESTIEM Times). The student writes a report on conducting the tasks, which includes the following: 1) In which positions did the student work, how long and how actively he/she participated? (0.5 pages). 2) What does the student think he/she has learned from the duties and how can the experience be utilized in the future? In particular, these skills should be considered: communication, co-operation, creativity, problem-solving, project management, learning, technical skills, international skills, commercial and financial skills and the development of self-knowledge (1 page). 3) How would the student think that the activity could be developed by the methods of industrial engineering and management? (1.5 pages). A report and a certificate on the tasks will be returned to the teacher tutor (at the Master's level to the study advisor), who determines the number of credits to be awarded. The length of the report is 3 pages.

Grading:

pass / fail

Person responsible:

Adjunct professor Jukka Majava

Working life cooperation:

-

Other information:

-

555310S: Demola Project, 5 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Simo-Pekka Kekäläinen
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Fall and Spring

Learning outcomes:

Upon completion of the course, the student is able to apply and use the core competencies of his/ her studies in a real life problem solving context. The student will learn skills that will allow him/ her to participate in a professional role in a project team that uses lean development methods to validate ideas and to create a demo or a prototype of a product, service, or other innovation. The course provides the student with experience in project work and improves the student´s team working skills as the course assignments are carried out by a multidisciplinary and international teams comprising of students with different backgrounds and skill sets. The course will also improve student´s communication and oral presentation skills as the student will need to summarize, rationalize, and present findings and ideas throughout the project.

Contents:

The entrepreneurial field project is organized within the international Demola network and the project comprises facilitated and supported real-life problem definition, data collection, problem solving, implementation and communication.

Mode of delivery:

Facilitated and supported project. Demola projects will be arranged two times per year; one season in the springtime (starting from January/February) and one in the autumn (starting from August/September). Dates can be checked from Weboodi.

Learning activities and teaching methods:

Learning takes place during the project as team learning and problem solving, with feedback from the responsible teachers and problem owning company or organization.

Target group:

Open to all. Students have to submit their application to Demola facilitators at oulu.demola.net when the season starts (either in January or August).

Prerequisites and co-requisites:

It is recommended that before starting Demola, the student has acquired some theoretical knowledge through his/her degree studies. Otherwise, there are no prerequisite knowledge requirements.

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:

Materials vary according to the assignment.

Assessment methods and criteria:

Active participation in the entire process, delivery of the required documents, presentations and a demo or a prototype.

Grading:

The course utilizes verbal grading scale “pass/fail”

Person responsible:

Simo Kekäläinen

Working life cooperation:

A group of students will carry out a development project to create a solution for the company’s genuine and existing challenges. The project team reports to a supervising teacher and a company representative(s).

Other information:

The number of students is restricted.

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 will be able to:

- solve small problems in organisations independently
- create a research plan, define a research problem and research questions and manage his/her own work according to the research plan
- give a justified solution or proposals
- utilise the latest research information in the field and can critically evaluate the information obtained
- create a written report according to the instructions

Contents:
The research topics are presented in the bachelor’s thesis seminar. The student can also propose an appropriate topic for the thesis.
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, 555204A Internship.
Recommended optional programme components:
The students will complete 555201A Bachelor's thesis seminar simultaneously.
Recommended or required reading:
-
Assessment methods and criteria:
This course includes writing a 25-page thesis. The work is assessed by using thesis assessment form http://www.oulu.fi/sites/default/files/content/Kandidaatinty%C3%B6n%20arviointilomake_tuta2.pdf .
Grading:
Pass-Fail
Person responsible:
Adjunct professor Jukka Majava
Working life cooperation:
Research topic / problem can be the examining and solving of the real problem of company or organisation.
Other information:
The instructions and forms related to bachelor's thesis are available at http://www.oulu.fi/ttk/node/18210 .

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 research as a literature review or empirical research
- apply the selected research methods and write an academic report
- 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. Partial independent work is possible if the bachelor's thesis is carried out during the summer time.
Learning activities and teaching methods:
Lectures 12 h, self-study 42 h.
Target group:
Industrial Engineering and Management students.
Prerequisites and co-requisites:
030005P Information Skills, 900061A Scientific Communication for Industrial Engineering and Management, 555201A Internship
Recommended optional programme components:
The students will complete 555200A Bachelor's Thesis simultaneously. If course 030005P Information Skills is not completed, it can be completed 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. Hanna Kropsu-Vehkaperä

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.

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

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

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Basic Studies
Laji: Course
Arvostelu: 1 - 5, pass, fail
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).

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.

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

Ei opintojaksokuvauksia.

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.

Electives

521242A: Introduction to Biomedical Engineering, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Myllylä
Opintokohteen kielet: English

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Period 1

Learning outcomes:

After completing the course, the student has a basic knowledge of the biomedical engineering discipline and the applications of engineering science to biomedical problems.

Contents:

Biomedical engineering is a highly multidisciplinary field of study that ranges from theory to applications at the interface between such as engineering, biophotonics, medicine and biology. This course will introduce the subdisciplines within biomedical engineering, including systems physiology, bioinstrumentation, bioimaging and biomedical signal analysis. General issues of each of the subdisciplines will be illustrated together with selected examples and clinical applications. A number of lectures will be given by different lecturers working in health tech companies, University of Oulu and Oulu University Hospital, presenting the fields of the biomedical engineering. In addition, course offerings of biomedical engineering at the University of Oulu are introduced.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

The course includes lectures, demonstrations and a group project.

Target group:

-

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

University exam
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:

Teemu Myllylä

Working life cooperation:

Guest lecturers

Other information:

-

521109A: Electrical Measurement Principles, 5 op

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

ECTS Credits:

5 ECTS credits / 136h

Language of instruction:

Course is lectured in Finnish. Lecture notes are available in English. Laboratory exercises and the exam can be done in English.

Timing:

Periods 1-2.

Learning outcomes:

1. is able to measure basic measurements with a multimeter,

2. is able to measure basic measurements with an oscilloscope,

3. is able to operate signal and function generators.

4. is able to 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. Course is open for all students in University of Oulu.

Prerequisites and co-requisites:

None.

Recommended optional programme components:

None.

Recommended or required reading:

Course material is in English and Finnish and can be found in Optima.

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:

-

764163P: Introduction to Biomedical Physics, 5 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Kyösti Heimonen
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 ECTS cr

Language of instruction:

Finnish

Timing:

1st spring

Learning outcomes:

Student can describe and explain some basics and concepts of certain areas of biomedical physics and knows central research targets and methods of biomedical physics.

Contents:

The course provides an introdution to biomedical physics from the point of views of biosciences and medical physics, and introduces basics of research and recording methods of the field, biophysical models, biosystems analysis, cellular and biomolecular physics, physics of fluids and their flow, and some other special issues. The course includes also a short introduction to some fields of physics that are of particular and occupational interest to medical physicists.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 36 h, self-study 96 h, final exam

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:

Lectures and lecture notes

Assessment methods and criteria:

Exam

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Kyösti Heimonen

Working life cooperation:

No work placement period

Other information:

Course website

080925A: Anatomy and Physiology for Biomedical Engineering, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Miika Nieminen, Kyösti Heimonen
Opintokohteen kielet: English

ECTS Credits:

5 ECTS credit points / 135 hours of work

Language of instruction:

English

Timing:

Master studies, Spring 2018, 4th period

Learning outcomes:

The student is able to define human anatomy and describe the physiological functions, and can explain how these can be investigated using different imaging methods and measurement systems

Contents:

The course acquaites the student to human physiology and anatomy. Areas covered include
Cells and tissues,
Skin, blood, blood circulation and the fluids of the body
Musculoskeletal organs
Defence reactions of the body
Respiration
Digestion,
Urine sectretion
Metabolic regulation, heat regulation
Reproduction
Sensory functions

Nervous system

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28h, demonstrations 12h. Independent studying and preparing reports 95h. Final examination

Target group:

Biomedical engineering and physics students

Recommended optional programme components:

The coure is an independent entity and does not require additional studies carried out at the same time. Imaging methods are more closely studied in the course Diagnostic Imaging.

Recommended or required reading:

Supplementary reading will be given in the beginning of the course.

Assessment methods and criteria:

Taking part in the lectures and demonstrations. Written reports on demonstrations. Final exam.
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 Miika Nieminen

Working life cooperation:

Course demonstrations will be held in hospital environment and are related to diagnostics.

Other information:

max. 40 students

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:

1st and 2nd periods

Learning outcomes:

The student can identify technologies in different fields of medical technology, can describe the principles behind these technologies and evaluate the advantages and limitations 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. Expert lecturers on other current topics related to the course.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Initial exam. Lectures 35 h / Demonstrations 10 h / Course assignment and self-study 90 h. Final exam which is based on lectures and all given materials.

Target group:

Bachelor students interested in Biomedical Engineering (medical technology, information technology, electrical engineering, physics, other related degree programs).

Recommended or required reading:

T.Sora, P. Antikainen, M. Laisalmi, S. Vierula: Sairaanhoidon teknologia, WSOY 2002[MH1] .
P. Pölönen, T. Ala-Kokko et al.: Akuuttihoidon laitteet, Duodecim 2013.
Available as an e-print: http://www.terveysportti.fi/dtk/aho/koti
The material addressed during the lectures.

Assessment methods and criteria:

Initial exam with multiple-choice questions (literature for the initial exam: T. Sora, P. Antikainen, M. Laisalmi, S. Vierula: Sairaanhoidon teknologia, WSOY 2002). Taking part in the lectures and demos. Learning assignment. Final exam with essay-type questions. In order to participate in the final exam the student must have passed initial exam and learning assignment.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5 or fail. Grading is based on the grade of the final exam.

Person responsible:

Professor Timo Jämsä

Working life cooperation:

The course will be mainly organized in the hospital, and lectures are given by clinical specialists.

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

Ei opintojaksokuvauksia.

764327A: Virtual measurement environments, 5 op

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

764627S	Virtual measurement environments	5.0 op

ECTS Credits:

5 ECTS, 135 hours of work

Language of instruction:

English

Timing:

Bachelor studies, 2nd period

Learning outcomes:

The students will learn how to construct software environments for measurements and data analysis.

Contents:

The course gives basic skills to use MATLAB and LabView programming environments to construct their own (custom) programs, with which they can both measure and analyze data with the computer.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 10 h, project work 60 h, self-study 65 h

Target group:

Bachelor students of Medical Technology and Biophysics. Also for the other students of the University of Oulu.

Prerequisites and co-requisites:

Basic skills in programming.

Recommended or required reading:

Lecture and exercise notes, other given material

Assessment methods and criteria:

Completion of projects.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5 or fail. The grading is based on projects.

Person responsible:

Professor Timo Jämsä

Working life cooperation:

None

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 period for exchange students, Faculty of Medicine
3rd period for degree students and other exchange students i.e. BME

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
- citizens providing their own health data, mHealth-solutions
- national healthcare information exchange in Finland- remote consultations, examples like teleradiology, telepsychiatry, telerehabilitation
- economical and functional assessment
- remote education
- future visions of health care information systems
- changing current topics in connected health like: AI, knowledge based medicine, cybersecurity, etc

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
(*Exchange student can relate their essay to the situation in their home countries)

Target group:

MSc and 3rd year BSc students of Biomedical Engineering and Medical Technology (medical technology, biomedical engineering, biophysics, physics, 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
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 one stands for a fail.

Person responsible:

Professor Jarmo Reponen
Nina Keränen

521302A: Circuit Theory 1, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

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

1. write and solve the equations describing the operation of a given electrical circuit

2. solve the sinusoidal steady-state solution using complex phasor arithmetics

3. solve time responses of electric circuits

4. simplify electrical circuits e.g. using equivalent circuits

5. 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, 22h exercises, and a simulation exercise.

Target group:

Finnish BSc students.

Prerequisites and co-requisites:

Matrix algebra, complex arithmetics, differential equations.

Recommended optional programme components:

Background to all analog electronics cources.

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:

-

555212P: Orientation Course for New Students, 1 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Industrial Engineering and Management
Arvostelu: 1 - 5, pass, fail
Opettajat: Eija Forsberg
Opintokohteen kielet: Finnish
Leikkaavuudet:

555203P Study Skills 2.0 op

Ei opintojaksokuvauksia.

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

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

900082Y: Second Official Language (Finnish), Oral Skills, 1 - 3 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Opintokohteen kielet: Finnish

900081Y: Second Official Language (Finnish), Written Skills, 1 - 2 op

Voimassaolo: 01.01.2015 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Opintokohteen kielet: Finnish

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

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Opintokohteen kielet: Swedish
Leikkaavuudet:

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

Ei opintojaksokuvauksia.

903012P: Technical German 3, 6 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Languages and Communication

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

Ei opintojaksokuvauksia.