

LAUREA UNIVERSITY OF APPLIED SCIENCES
FUAS, tekniikan ja liikenteen ala, FA-TEKN

		1. year	2. year	3. year	4. year	5. year	6. year	7. year
OP	OPINNOT	2824	1943,5	0	0	0	0	0
FLM000C	Differential and integral calculus I	3	0	0	0	0	0	0
FLM000C	Purchasing and retailing in the clothing industry	3	0	0	0	0	0	0
FLM000C	Special project in media technology	5	0	0	0	0	0	0
FLM000C	Special project in information technology	5	0	0	0	0	0	0
FLM000C	Climate and energy targets in Europe	0	4	0	0	0	0	0
FLM000C	Environmental legislation	5	0	0	0	0	0	0
FHA000C	Project Managemet	3	0	0	0	0	0	0
FHA000C	Design Project	15	0	0	0	0	0	0
FHA000C	Project Technology	3	0	0	0	0	0	0
FHA000C	Productivity	3	0	0	0	0	0	0
FHA000C	Product Development	3	0	0	0	0	0	0
FHA000C	Quality Control	3	0	0	0	0	0	0
FHA000C	Software Development Project	15	0	0	0	0	0	0
FHA000C	Traffic Planning Project	15	0	0	0	0	0	0
FHA000C	Project of Business and Technology	3	0	0	0	0	0	0
FHA000C	Organisational Communication	0	3	0	0	0	0	0
FHA000C	Algebra	0	3	0	0	0	0	0
FHA000C	Geometry and Linear Algebra	0	3	0	0	0	0	0
FHA000C	Fundamentals of Automation Engineering	0	4	0	0	0	0	0
FHA000C	Electrical Engineering	0	3	0	0	0	0	0
FHA000C	Specialist Communication	0	3	0	0	0	0	0
FHA000C	Instrumentation	0	3	0	0	0	0	0
FHA000C	Application Development	0	4	0	0	0	0	0
FHA000C	Field Design	0	4	0	0	0	0	0
FHA000C	Electrical Machine Automation Devices	0	4	0	0	0	0	0
FHA000C	Working English	0	3	0	0	0	0	0
FHA000C	Professional Swedish	0	3	0	0	0	0	0
FHA000C	Physics 1	0	3	0	0	0	0	0
FHA000C	Professional IT Tools	0	6	0	0	0	0	0
FHA000C	Programmable Logic Controllers	0	3	0	0	0	0	0
FHA000C	Measurement Technology	0	5	0	0	0	0	0
FHA000C	Electrical Power Engineering	0	6	0	0	0	0	0
FHA000C	Electronics	0	5	0	0	0	0	0
FHA000C	Professional English	0	3	0	0	0	0	0
FHA000C	Engineering Physics	0	3	0	0	0	0	0
FHA000C	Mathematics 2a	0	3	0	0	0	0	0
FHA000C	Programming	0	5	0	0	0	0	0
FHA000C	Working English	0	3	0	0	0	0	0
FHA000C	Daily Finnish	0	4	0	0	0	0	0

FHA000C	Learning Skills	0	3	0	0	0	0	0
FHA000C	Computer Skills	0	3	0	0	0	0	0
FHA000C	Algebra	0	3	0	0	0	0	0
FHA000C	Physics 1	0	3	0	0	0	0	0
FHA000C	Electrical Engineering	0	3	0	0	0	0	0
FHA000C	Fundamentals of Automation Engineering	0	4	0	0	0	0	0
FHA000C	Differential and Integral Calculus	0	3	0	0	0	0	0
FHA000C	Working Finnish	0	6	0	0	0	0	0
FHA000C	Physics 2	0	3	0	0	0	0	0
FHA000C	Programming	0	4	0	0	0	0	0
FHA000C	Measurement Technology	0	5	0	0	0	0	0
FHA000C	Electronics Applications in Automation Engineering	0	3	0	0	0	0	0
FHA000C	Applied Mathematics	0	3	0	0	0	0	0
FHA000C	Fieldbus Technology	0	3	0	0	0	0	0
FHA000C	Distributed Control Systems	0	4	0	0	0	0	0
FHA000C	Field Design	0	4	0	0	0	0	0
FHA000C	Control Engineering	0	4	0	0	0	0	0
FHA000C	Pneumatics and Hydraulics	0	3	0	0	0	0	0
FHA000C	Technical Documentation	0	3	0	0	0	0	0
FHA000C	Human-Machine Interface	0	4	0	0	0	0	0
FHA000C	Industrial Processes	0	4	0	0	0	0	0
FHA000C	Maintenance Economics	0	4	0	0	0	0	0
FHA000C	Industrial Maintenance	0	4	0	0	0	0	0
FHA000C	Measuring and Automation Programs	0	4	0	0	0	0	0
FHA000C	Software Technology in Automation	0	4	0	0	0	0	0
FHA000C	Safety in Automation	0	3	0	0	0	0	0
FHA000C	Entrepreneurship	0	3	0	0	0	0	0
FHA000C	Fundamentals of Data Communications	0	3	0	0	0	0	0
FHA000C	Marketing	0	3	0	0	0	0	0
FHA000C	Numerical Analysis	3	0	0	0	0	0	0
FHA000C	Finite Element Methods for Mechanical Engineers	5	0	0	0	0	0	0
FHA000C	Engineering Physics	0	3	0	0	0	0	0
FHA000C	Computer Based Mathematics	0	3	0	0	0	0	0
FHA000C	Internet and Telecommunication	0	3	0	0	0	0	0
FHA000C	Workshop Measurement and Tolerances	0	6	0	0	0	0	0
FHA000C	Industrial Economics	0	3	0	0	0	0	0
FHA000C	Modeling 1	0	3	0	0	0	0	0
FHA000C	Differential and Integral Calculus	0	3	0	0	0	0	0
FHA000C	Application Programming	0	4	0	0	0	0	0
FHA000C	Maintenance	3	0	0	0	0	0	0

FHA000C	Traffic and Transport Economy	3	0	0	0	0	0	0
FHA000C	Computer skills	3	0	0	0	0	0	0
FHA000C	Physics 2	3	0	0	0	0	0	0
FHA000C	Fieldbuses	3	0	0	0	0	0	0
FHA000C	Programming	5	0	0	0	0	0	0
FHA000C	Control Room Applications	4	0	0	0	0	0	0
FHA000C	Miniature Automation Desing	4	0	0	0	0	0	0
FHA000C	Learning Skills	3	0	0	0	0	0	0
FHA000C	Technical Documentation	3	0	0	0	0	0	0
FHA000C	Mathematics 2b	3	0	0	0	0	0	0
FHA000C	Instrumentation	3	0	0	0	0	0	0
FHA000C	Electronics Applications in Automation	3	0	0	0	0	0	0
FHA000C	Electrical Drives	3	0	0	0	0	0	0
FHA000C	Studying Finnish	5	0	0	0	0	0	0
FHA000C	Geometry and Linear Algebra	3	0	0	0	0	0	0
FHA000C	Professional IT Tools	6	0	0	0	0	0	0
FHA000C	Practical Automation Works	5	0	0	0	0	0	0
FHA000C	Electronics	5	0	0	0	0	0	0
FHA000C	Professional Mathematical Methods	3	0	0	0	0	0	0
FHA000C	Entrepreneurial activities	3	0	0	0	0	0	0
FHA000C	Programmable Logic Controllers	3	0	0	0	0	0	0
FHA000C	Instrumentation	3	0	0	0	0	0	0
FHA000C	Robotics	4	0	0	0	0	0	0
FHA000C	Networks in Automation	4	0	0	0	0	0	0
FHA000C	Analysis Measurements	4	0	0	0	0	0	0
FHA000C	Machine Vision	3	0	0	0	0	0	0
FHA000C	Control Engineering	4	0	0	0	0	0	0
FHA000C	Fundamentals of Data Communications	3	0	0	0	0	0	0
FHA000C	Mechanical Engineering Measurements	3	0	0	0	0	0	0
FHA000C	Machine Dynamics	4	0	0	0	0	0	0
FHA000C	Mathematical Statistics	3	0	0	0	0	0	0
FHA000C	Traffic Control Systems	5	0	0	0	0	0	0
FHA000C	3D Techniques and Visualization	3	0	0	0	0	0	0
FHA000C	Programming	3	0	0	0	0	0	0
FHA000C	Modeling 2	3	0	0	0	0	0	0
FHA000C	Design for Manufacturability and Assembly	3	0	0	0	0	0	0
FHA000C	Professional Mathematical Methods	3	0	0	0	0	0	0
FHA000C	Entrepreneurial activities	3	0	0	0	0	0	0
FHA000C	Basics of Urban Planning	4	0	0	0	0	0	0
FLM000C	Environmental technology and research	5	0	0	0	0	0	0

FLM000C	Urban and communicative planning	0	5	0	0	0	0	0
FLM000C	Climate change and its environmental impacts	5	0	0	0	0	0	0
FLM000C	Environmental management	5	0	0	0	0	0	0
FLM000C	Future workshop	5	0	0	0	0	0	0
FHA000C	Traffic Planning Software	5	0	0	0	0	0	0
FHA000C	Working in Project Business	3	0	0	0	0	0	0
FHA000C	Design Project	12	0	0	0	0	0	0
FHA000C	Traffic Planning Project	12	0	0	0	0	0	0
FHA000C	Software Development Project	12	0	0	0	0	0	0
FLM000C	Swedish WrittenSwedish Language Written Skills	1,5	0	0	0	0	0	0
FLM000C	Swedish SpokenSwedish Language Oral Skills	1,5	0	0	0	0	0	0
FHA000C	Hydraulics and Pneumatics in Machine Automation	6	0	0	0	0	0	0
FLM000C	Differential and integral calculus	4	0	0	0	0	0	0
FLM000C	Descriptive geometry and perspectives	3	0	0	0	0	0	0
FLM000C	Chemistry	3	0	0	0	0	0	0
FLM000C	Plastics engineering lab	5	0	0	0	0	0	0
FLM000C	Research and development project	0	3	0	0	0	0	0
FLM000C	Mechanisation Units	3	0	0	0	0	0	0
FLM000C	Project 2	0	7	0	0	0	0	0
FLM000C	WWW project	5	0	0	0	0	0	0
FLM000C	Digital photography and image processing	6	0	0	0	0	0	0
FLM000C	Vector graphics	6	0	0	0	0	0	0
FLM000C	Research project	4	0	0	0	0	0	0
FLM000C	Commerical and industrial areas	10	0	0	0	0	0	0
FLM000C	Physics for environmental technology II	3	0	0	0	0	0	0
FLM000C	Chemistry for environmental technology	3	0	0	0	0	0	0
FLM000C	Waste, Energy and Water Management	6	0	0	0	0	0	0
FLM000C	Construction materials and manufacturing technology	3	0	0	0	0	0	0
FLM000C	ICT-Mathematics	4	0	0	0	0	0	0
FLM000C	Introduction to Programming	4	0	0	0	0	0	0
FLM000C	WWW Technologies	4	0	0	0	0	0	0
FLM000C	ICT-Mathematics	4	0	0	0	0	0	0
FLM000C	Basics of Programming	4	0	0	0	0	0	0
FLM000C	WWW Technologies	4	0	0	0	0	0	0
FLM000C	Residential Surroundings	5	0	0	0	0	0	0
FLM000C	Planning of landscapes and immediate surroundings	5	0	0	0	0	0	0
FLM000C	German language	3	0	0	0	0	0	0
FLM000C	English language and communicationEnglish Language	3	0	0	0	0	0	0
FLM000C	Preliminary course for SwedishIntroduction to Swedish Language	3	0	0	0	0	0	0

FLM000C	Physics Labs	3	0	0	0	0	0	0
FLM000C	Integral and Differential Calculus	3	0	0	0	0	0	0
FLM000C	Mechanics	3	0	0	0	0	0	0
FLM000C	Electricity and magnetism	4	0	0	0	0	0	0
FLM000C	Mathematical Statistics I	3	0	0	0	0	0	0
FLM000C	Environmental ICT project 2	3	0	0	0	0	0	0
FLM000C	Energy and environmental issues	4	0	0	0	0	0	0
FLM000C	Maintenance	3	0	0	0	0	0	0
FLM000C	Company projects	4	0	0	0	0	0	0
FLM000C	English for mechatronics	3	0	0	0	0	0	0
FLM000C	Electric motor drives	3	0	0	0	0	0	0
FLM000C	Information security and networks	3	0	0	0	0	0	0
FLM000C	Wireless networks project	3	0	0	0	0	0	0
FLM000C	Network management systems	3	0	0	0	0	0	0
FLM000C	Digital technology	3	0	0	0	0	0	0
FLM000C	Electronic circuits	3	0	0	0	0	0	0
FLM000C	Town Planning	5	0	0	0	0	0	0
FLM000C	Life cycle analysis of bio fuels	3	0	0	0	0	0	0
FLM000C	Project: sustainable development in urban ecosystems	3	0	0	0	0	0	0
FLM000C	International treaties and legislation	3	0	0	0	0	0	0
FLM000C	Environmental systems and quality systems	3	0	0	0	0	0	0
FLM000C	Soil and landfill sampling, measurements and analyses	4	0	0	0	0	0	0
FLM000C	Geographical Information	3	0	0	0	0	0	0
FLM000C	Remediation of contaminated soil	6	0	0	0	0	0	0
FLM000C	Energy sources of the future	3	0	0	0	0	0	0
FLM000C	Planning the use and maintenance of water systems	6	0	0	0	0	0	0
FLM000C	Community Planning	3	0	0	0	0	0	0
FLM000C	Wood as raw material	4	0	0	0	0	0	0
FLM000C	Wood product project	4	0	0	0	0	0	0
FLM000C	Jointing techniques	2	0	0	0	0	0	0
FLM000C	Machinery in the plastics industry	3	0	0	0	0	0	0
FLM000C	Plastic as material	4	0	0	0	0	0	0
FLM000C	Machine embroidery	3	0	0	0	0	0	0
FLM000C	Textile materials and structures	4	0	0	0	0	0	0
FLM000C	Development and manufacture of the structures of outdoor clothing	6	0	0	0	0	0	0
FLM000C	Physics for textile and clothing technology	5	0	0	0	0	0	0
FLM000C	Chemistry for textile and clothing technology	6	0	0	0	0	0	0
FLM000C	Basics of clothing shapes	3	0	0	0	0	0	0
FLM000C	Basics of garment manufacture	5	0	0	0	0	0	0
FLM000C	Clothing workshop	3	0	0	0	0	0	0
FLM000C	Green ICT Project 2	3	0	0	0	0	0	0

FLM000C	Communicating your expertise	4	0	0	0	0	0	0
FLM000C	GIS in environmental planning and research	5	0	0	0	0	0	0
FLM000C	ICT English	3	0	0	0	0	0	0
FLM000C	Geometry and Trigonometry	3	0	0	0	0	0	0
FLM000C	Geometry and trigonometry	3	0	0	0	0	0	0
FLM000C	Continuation course in ICT mathematics	4	0	0	0	0	0	0
FLM000C	Mathematical statistics II	3	0	0	0	0	0	0
FLM000C	Management and production control	3	0	0	0	0	0	0
FLM000C	English for plastics engineering	3	0	0	0	0	0	0
FLM000C	Business economics	2	0	0	0	0	0	0
FLM000C	Trade and contract law	3	0	0	0	0	0	0
FLM000C	Board technology	3	0	0	0	0	0	0
FLM000C	English for wood technology	3	0	0	0	0	0	0
FLM000C	Production of wood constructions	3	0	0	0	0	0	0
FLM000C	Technical construction timber products	3	0	0	0	0	0	0
FLM000C	Plywood technology	4	0	0	0	0	0	0
FLM000C	Digital technology	2	0	0	0	0	0	0
FLM000C	Hydraulics	2	0	0	0	0	0	0
FLM000C	Joints and machine components	2	0	0	0	0	0	0
FLM000C	Material and manufacturing technology I	4	0	0	0	0	0	0
FLM000C	Continuation course in programming (C language)	3	0	0	0	0	0	0
FLM000C	Control Design Basics	4	0	0	0	0	0	0
FLM000C	Robotics Advanced Course	3	0	0	0	0	0	0
FLM000C	Basics of robotics	3	0	0	0	0	0	0
FLM000C	Use of electrical design software	3	0	0	0	0	0	0
FLM000C	Electrical Design Basics	3	0	0	0	0	0	0
FLM000C	Management Advanced Course	3	0	0	0	0	0	0
FLM000C	Quality engineering	2	0	0	0	0	0	0
FLM000C	Business plan	3	0	0	0	0	0	0
FLM000C	Plant layout planning 2	3	0	0	0	0	0	0
FLM000C	Architecture project	5	0	0	0	0	0	0
FLM000C	Distributed and mobile systems	3	0	0	0	0	0	0
FLM000C	Distributed and mobile systems	5	0	0	0	0	0	0
FLM000C	Programming methodsProgramming methods	3	0	0	0	0	0	0
FLM000C	Software engineering project	3	0	0	0	0	0	0
FLM000C	Software production	3	0	0	0	0	0	0
FLM000C	Software production	5	0	0	0	0	0	0
FLM000C	Real-time systems	4	0	0	0	0	0	0
FLM000C	Data structures and algorithms	4	0	0	0	0	0	0
FLM000C	Programming workshop	3	0	0	0	0	0	0

FLM000C	Maintenance and testing of software products	5	0	0	0	0	0	0
FLM000C	Digital signal processing	4	0	0	0	0	0	0
FLM000C	Electronic components and documentation	4	0	0	0	0	0	0
FLM000C	Dedicated programming	3	0	0	0	0	0	0
FLM000C	Microprocessors in embedded systems	5	0	0	0	0	0	0
FLM000C	Programmable circuits	5	0	0	0	0	0	0
FLM000C	Audio applications of signal processing	3	0	0	0	0	0	0
FLM000C	Electrical measurement technology and electronics lab	3	0	0	0	0	0	0
FLM000C	Signal processors Signal processors	5	0	0	0	0	0	0
FLM000C	Filter designFilter design	3	0	0	0	0	0	0
FLM000C	Data transfer in embedded systems	3	0	0	0	0	0	0
FLM000C	Information security and networks	4	0	0	0	0	0	0
FLM000C	Wireless transfer technologyWireless transfer technology	5	0	0	0	0	0	0
FLM000C	Server systems and virtualization	4	0	0	0	0	0	0
FLM000C	Routing networks	4	0	0	0	0	0	0
FLM000C	Telecommunications technology workshop 1	3	0	0	0	0	0	0
FLM000C	Telecommunications technology workshop 2	5	0	0	0	0	0	0
FLM000C	Data transfer technology	3	0	0	0	0	0	0
FLM000C	Telecommunications solutions in companies	4	0	0	0	0	0	0
FLM000C	Network services of companies	4	0	0	0	0	0	0
FLM000C	3D Animation I	5	0	0	0	0	0	0
FLM000C	3D Modelling I	5	0	0	0	0	0	0
FLM000C	CAD I	5	0	0	0	0	0	0
FLM000C	Interactive presentations	5	0	0	0	0	0	0
FLM000C	Project workProject work	5	0	0	0	0	0	0
FLM000C	WWW Multimedia	3	0	0	0	0	0	0
FLM000C	WWW programming	5	0	0	0	0	0	0
FLM000C	Visual communicationVisual communication	3	0	0	0	0	0	0
FLM000C	Visualization workshop III	5	0	0	0	0	0	0
FLM000C	Green ICT Industrial Project	3	0	0	0	0	0	0
FLM000C	Industrial networks	5	0	0	0	0	0	0
FLM000C	Preliminary course for English	3	0	0	0	0	0	0
FLM000C	Marketing and management	4	0	0	0	0	0	0
FLM000C	Data networks basics	4	0	0	0	0	0	0
FLM000C	Town planning	4	0	0	0	0	0	0
FLM000C	English for environmental planning	3	0	0	0	0	0	0
FLM000C	Design workshop	3	0	0	0	0	0	0
FLM000C	Traffic environments	3	0	0	0	0	0	0
FLM000C	Life cycle analysis of products and services	5	0	0	0	0	0	0
FLM000C	Bioenergy and other renewable energy sources	4	0	0	0	0	0	0

FLM000C	Residential environments	5	0	0	0	0	0	0
FLM000C	CAD I Design	3	0	0	0	0	0	0
FLM000C	Life cycle thinking and material efficiency	3	0	0	0	0	0	0
FLM000C	Air protection and emission measurements	6	0	0	0	0	0	0
FLM000C	Landscape in Land Use Planning	5	0	0	0	0	0	0
FLM000C	Built environment and communities	5	0	0	0	0	0	0
FLM000C	Water sampling, field measurements and analyses	3	0	0	0	0	0	0
FLM000C	Assessment of Environmental Impact	3	0	0	0	0	0	0
FLM000C	Environmental Legislation and Administration	3	0	0	0	0	0	0
FLM000C	Physics lab course	3	0	0	0	0	0	0
FLM000C	Mechanics	3	0	0	0	0	0	0
FLM000C	Technical drawing	4	0	0	0	0	0	0
FLM000C	Industrial automation lab	3	0	0	0	0	0	0
FLM000C	Entrepreneurship studiesStudies in Entrepreneurship	4	0	0	0	0	0	0
FLM000C	Heat Energy	3	0	0	0	0	0	0
FLM000C	Marketing and brand building	3	0	0	0	0	0	0
FLM000C	Projects and managment	3	0	0	0	0	0	0
FLM000C	Textile ecology and ethical issues	3	0	0	0	0	0	0
FLM000C	2D Animation	3	0	0	0	0	0	0
FLM000C	Energy technology	3	0	0	0	0	0	0
FLM000C	Environmental chemistry and ecotoxicology	3	0	0	0	0	0	0
FLM000C	Laboratory methods in environmental research	3	0	0	0	0	0	0
FLM000C	CAM	3	0	0	0	0	0	0
FLM000C	Basics of wood industry	3	0	0	0	0	0	0
FLM000C	Sawmilling and processing of sawn goods	3	0	0	0	0	0	0
FLM000C	Engineering design 3D CAD	3	0	0	0	0	0	0
FLM000C	Strength of materials 2	3	0	0	0	0	0	0
FLM000C	Plastics chemistry	3	0	0	0	0	0	0
FLM000C	Basics of pattern techniques	3	0	0	0	0	0	0
FLM000C	Basics of manufacturing technology	3	0	0	0	0	0	0
FLM000C	Testing of textiles	3	0	0	0	0	0	0
FLM000C	Advanced course in transducer technology	3	0	0	0	0	0	0
FLM000C	Supplementary studies in Swedish	3	0	0	0	0	0	0
FLM000C	German language	3	0	0	0	0	0	0
FLM000C	Continuation course on SolidWorks	3	0	0	0	0	0	0
FLM000C	Basics of German	3	0	0	0	0	0	0
FLM000C	Basic Russian, continuation course 1	3	0	0	0	0	0	0
FLM000C	Basics of Russian	3	0	0	0	0	0	0
FLM000C	Basic course of Russian	3	0	0	0	0	0	0
FLM000C	Russian Environmental Week	3	0	0	0	0	0	0

FLM000C	Elective course in entrepreneurship and innovation	3	0	0	0	0	0	0
FLM000C	Management of cultural landscapes	3	0	0	0	0	0	0
FLM000C	Using sources	3	0	0	0	0	0	0
FLM000C	Physics for environmental technology	3	0	0	0	0	0	0
FLM000C	Municipal Engineering and Designing of Networks	3	0	0	0	0	0	0
FLM000C	Basics of physics and mechanics	0	5	0	0	0	0	0
FLM000C	Basic course in physics	5	0	0	0	0	0	0
FLM000C	Chemistry	5	0	0	0	0	0	0
FLM000C	Management and quality	0	2	0	0	0	0	0
FLM000C	Professional Communication (Finnish)Professional Communication (Finnish)	3	0	0	0	0	0	0
FHA000C	Electronics Applications in Automation Engineering	3	0	0	0	0	0	0
FHA000C	Cloud Services	3	0	0	0	0	0	0
FHA000C	Game Design and Programming	0	3	0	0	0	0	0
FHA000C	Videotutanto	3	0	0	0	0	0	0
FHA000C	Controlling Applications in Local Area Networks	0	3	0	0	0	0	0
FHA000C	Local Area Network Analysing and Monitoring Applications	3	0	0	0	0	0	0
FHA000C	IP SMART - Smart Devices and Product Development	4	0	0	0	0	0	0
FHA000C	Telecommunications in Automation	0	4	0	0	0	0	0
FHA000C	Occupational Safety	3	0	0	0	0	0	0
FHA000C	Occupational Safety	0	3	0	0	0	0	0
FHA000C	Energy Efficiency and Sustainable Energy in Buildings	5	0	0	0	0	0	0
FHA000C	Practical Automation Works	5	0	0	0	0	0	0
FHA000C	Professional Skills	0	3	0	0	0	0	0
FHA000C	Applied Mathematics	0	3	0	0	0	0	0
FHA000C	Engineering Physics	0	3	0	0	0	0	0
FHA000C	Physics Laboratory	3	0	0	0	0	0	0
FHA000C	Swedish preparatory studies	0	3	0	0	0	0	0
FHA000C	Research and development skills	0	3	0	0	0	0	0
FHA000C	Life Cycle Thinking	0	4	0	0	0	0	0
FHA000C	Process Technology	0	4	0	0	0	0	0
FHA000C	Measuring and Automation Programs	0	4	0	0	0	0	0
FHA000C	Measurements and Analysis	0	3	0	0	0	0	0
FHA000C	Automation Networking	0	4	0	0	0	0	0
FHA000C	English preparatory studies	3	0	0	0	0	0	0
FHA000C	Professional English	3	0	0	0	0	0	0
FHA000C	Instrumentation	0	3	0	0	0	0	0
FHA000C	Application Programming	4	0	0	0	0	0	0
FHA000C	Fundamentals of Maintenance	0	3	0	0	0	0	0

FHA000C	Technology Application in Automation	0	4	0	0	0	0	0
FHA000C	Field Design	4	0	0	0	0	0	0
FHA000C	Electrical Drives	3	0	0	0	0	0	0
FHA000C	Automation Applications in Graphical Development Environment	0	4	0	0	0	0	0
FHA000C	Automation Application in Software Environment	4	0	0	0	0	0	0
FHA000C	Control Engineering	4	0	0	0	0	0	0
FHA000C	Applied Mathematics	0	3	0	0	0	0	0
FHA000C	Fieldbuses	3	0	0	0	0	0	0
FHA000C	Automation Technology Project Work 2	0	6	0	0	0	0	0
FHA000C	Life Cycle Thinking	0	4	0	0	0	0	0
FHA000C	Process Technology	4	0	0	0	0	0	0
FHA000C	Maintenance	0	4	0	0	0	0	0
FHA000C	Project of Maintenance Work	3	0	0	0	0	0	0
FLM000C	Ravinteiden talteenotto ja energian tuotanto jätevesistä levien avulla	0	5	0	0	0	0	0
FLM000C	Development Management Project	0	5	0	0	0	0	0
FLM000C	3d printing	3	0	0	0	0	0	0
FHA000C	Professional English	3	0	0	0	0	0	0
FHA000C	Professional Skills	0	3	0	0	0	0	0
FHA000C	Electrical Power Engineering	0	6	0	0	0	0	0
FHA000C	Application Programming	0	4	0	0	0	0	0
FHA000C	Field Design	0	4	0	0	0	0	0
FHA000C	Electrical Design	0	4	0	0	0	0	0
FHA000C	Engineering Physics	0	3	0	0	0	0	0
FHA000C	Physics Laboratory	0	3	0	0	0	0	0
FHA000C	Automation Applications in Graphical Development Environment	0	4	0	0	0	0	0
FHA000C	Automation Application in Software Environment	4	0	0	0	0	0	0
FHA000C	Research and development skills	0	3	0	0	0	0	0
FHA000C	Automation Project Work 3	0	4	0	0	0	0	0
FHA000C	Maintenance Project	3	0	0	0	0	0	0
FHA000C	Human Machine Interfafce	0	4	0	0	0	0	0
FHA000C	Networks in Automation	0	4	0	0	0	0	0
FHA000C	Robotics	4	0	0	0	0	0	0
FHA000C	Machine Vision	3	0	0	0	0	0	0
FHA000C	Simulation in Production	6	0	0	0	0	0	0
FHA000C	Graduation Thesis	15	0	0	0	0	0	0
FHA000C	Human Relations	0	4	0	0	0	0	0
FHA000C	Laitesuunnittelu	5	0	0	0	0	0	0
FHA000C	Project of Maintenance Work	3	0	0	0	0	0	0
FHA000C	Electrical Drives	0	3	0	0	0	0	0
FHA000C	Robotics	0	4	0	0	0	0	0
FHA000C	Electrical Installations	0	3	0	0	0	0	0

FHA000C	Building Automation	5	0	0	0	0	0	0
FHA000C	Electrical Installations	0	3	0	0	0	0	0
FHA000C	Economics	0	3	0	0	0	0	0
FHA000C	Business Planning	0	5	0	0	0	0	0
FHA000C	Timber and Steel Constructions	0	5	0	0	0	0	0
FHA000C	Renovation 2	0	5	0	0	0	0	0
FHA000C	Research and Development Skills	3	0	0	0	0	0	0
FHA000C	Mathematics 3	0	3	0	0	0	0	0
FHA000C	Building Physics	3	0	0	0	0	0	0
FHA000C	Site Practices	3	0	0	0	0	0	0
FHA000C	Procurement and Logistics	6	0	0	0	0	0	0
FHA000C	Cost Estimating	0	6	0	0	0	0	0
FHA000C	Concrete Technology	0	5	0	0	0	0	0
FHA000C	Concrete Structure Design	6	0	0	0	0	0	0
FHA000C	Renovation 1	5	0	0	0	0	0	0
FHA000C	Mathematics 2	0	3	0	0	0	0	0
FHA000C	Safety at Construction Site	4	0	0	0	0	0	0
FHA000C	Economics of the Construction Industry	0	4	0	0	0	0	0
FHA000C	Contracts and Legislation	3	0	0	0	0	0	0
FHA000C	Basics of Structural Engineering 1	0	4	0	0	0	0	0
FHA000C	Soil Construction	0	3	0	0	0	0	0
FHA000C	Electric Systems of Buildings	3	0	0	0	0	0	0
FHA000C	Site Planning	4	0	0	0	0	0	0
FHA000C	Production Management	0	6	0	0	0	0	0
FHA000C	Concrete Construction	0	5	0	0	0	0	0
FHA000C	Chemistry of Building Materials	0	3	0	0	0	0	0
FHA000C	Basics of Construction Physics	3	0	0	0	0	0	0
FHA000C	Safety at Work	0	3	0	0	0	0	0
FHA000C	Site Surveying	4	0	0	0	0	0	0
FHA000C	Basics of Municipal Engineering	0	3	0	0	0	0	0
FHA000C	Detached House Building	0	3	0	0	0	0	0
FHA000C	Building of Multistorey Buildings	3	0	0	0	0	0	0
FHA000C	Task and Weekly Work Planning	8	0	0	0	0	0	0
FHA000C	Building Renovation	0	6	0	0	0	0	0
FHA000C	Mechanics Advanced Course	0	6	0	0	0	0	0
FHA000C	Applied Physics Advanced Course	3	0	0	0	0	0	0
FHA000C	Building Renovation Advanced Course	3	0	0	0	0	0	0
FHA000C	Structural Steel Design 1	0	6	0	0	0	0	0
FHA000C	Timber Constructions	0	6	0	0	0	0	0
FHA000C	Bridge Construction	0	3	0	0	0	0	0

FHA000C	Soil Construction Advanced Course	0	3	0	0	0	0	0
FHA000C	Project and Site Management	0	15	0	0	0	0	0
FHA000C	3D Modelling	0	5	0	0	0	0	0
FHA000C	Cost Estimating	0	4	0	0	0	0	0
FHA000C	Procurement	0	3	0	0	0	0	0
FHA000C	Municipal Engineering Seminar	0	3	0	0	0	0	0
FHA000C	Noise Control	0	3	0	0	0	0	0
FHA000C	Environmental Impacts Assesment in Infra Projects	3	0	0	0	0	0	0
FHA000C	Concrete Structure Design	0	6	0	0	0	0	0
FHA000C	Mechanics 2	0	6	0	0	0	0	0
FHA000C	Professional communication	0	3	0	0	0	0	0
FHA000C	Building Physics	0	3	0	0	0	0	0
FHA000C	Basic Course in Steel Structures	3	0	0	0	0	0	0
FHA000C	Realisation Plans	3	0	0	0	0	0	0
FHA000C	Renovation	6	0	0	0	0	0	0
FHA000C	Building Contracting	0	5	0	0	0	0	0
FHA000C	Site Planning	0	3	0	0	0	0	0
FHA000C	Building Contracts	0	3	0	0	0	0	0
FHA000C	Procurement and Logistics	3	0	0	0	0	0	0
FHA000C	Production Management and Quality Assurance	0	3	0	0	0	0	0
FHA000C	Land Use Planning	3	0	0	0	0	0	0
FHA000C	Construction and maintenance of traffic routes	0	6	0	0	0	0	0
FHA000C	Management and Leadership	3	0	0	0	0	0	0
FHA000C	Task and Weekly Work Planning	0	3	0	0	0	0	0
FHA000C	Production Management	0	15	0	0	0	0	0
FHA000C	Climate Change and Infrastructures	3	0	0	0	0	0	0
FHA000C	Environmental Geology	3	0	0	0	0	0	0
FHA000C	Earthworks	3	0	0	0	0	0	0
FHA000C	Project Activities	0	3	0	0	0	0	0
FHA000C	Concrete Constructions	0	3	0	0	0	0	0
FHA000C	Housing and Office Building	0	6	0	0	0	0	0
FHA000C	Basics of Strength Theory	0	3	0	0	0	0	0
FHA000C	Basics of Structural Engineering	3	0	0	0	0	0	0
FHA000C	Concrete Technology	0	3	0	0	0	0	0
FHA000C	Building Design 1	3	0	0	0	0	0	0
FHA000C	HPAC-systems of Buildings	3	0	0	0	0	0	0
FHA000C	Basics of Concrete Structure Design	3	0	0	0	0	0	0
FHA000C	Applied Mathematics	3	0	0	0	0	0	0
FHA000C	Building Production	3	0	0	0	0	0	0
FHA000C	Land Surveying Advanced Course	0	3	0	0	0	0	0

FHA000C	Road and Street Planning	0	3	0	0	0	0	0
FHA000C	Applied Data Processing	3	0	0	0	0	0	0
FHA000C	Water Supply Technology	3	0	0	0	0	0	0
FHA000C	Chemistry	3	0	0	0	0	0	0
FHA000C	Mechanics	3	0	0	0	0	0	0
FHA000C	Detached House Building	0	3	0	0	0	0	0
FHA000C	Basics of Surveying	0	3	0	0	0	0	0
FHA000C	Geotechnics	0	3	0	0	0	0	0
FHA000C	Basic Course in Steel Structures	3	0	0	0	0	0	0
FHA000C	R&D Assignment	0	5	0	0	0	0	0
FHA000C	Manufacturing and Execution of Steel Constructions	0	6	0	0	0	0	0
FHA000C	Design Assignment	5	0	0	0	0	0	0
FHA000C	Ecological Sanitation	0	3	0	0	0	0	0
FHA000C	Construction and Project Management	0	3	0	0	0	0	0
FHA000C	Pollution Control in Industrial Processes	0	3	0	0	0	0	0
FHA000C	Remediation of Contaminated Soils and Waters	0	3	0	0	0	0	0
FHA000C	Hydrology and Hydrogeology	0	3	0	0	0	0	0
FHA000C	Environmental and Quality Management Systems	3	0	0	0	0	0	0
FHA000C	Environmental and Safety Risks	3	0	0	0	0	0	0
FHA000C	Environmental Economics	3	0	0	0	0	0	0
FHA000C	Research and development skills	3	0	0	0	0	0	0
FHA000C	Building Services, HVAC and Plumbing	0	6	0	0	0	0	0
FHA000C	Structural Engineering 2	0	6	0	0	0	0	0
FHA000C	Building Physics	3	0	0	0	0	0	0
FHA000C	Renovation	0	6	0	0	0	0	0
FHA000C	Management and Leadership, Managing Across Cultures	0	5	0	0	0	0	0
FHA000C	Structural Steel Design 2	0	6	0	0	0	0	0
FHA000C	3D Structural Design	4	0	0	0	0	0	0
FHA000C	Environmental Geology	3	0	0	0	0	0	0
FHA000C	Life Cycle Assessment and Product Ecodesign	3	0	0	0	0	0	0
FHA000C	Microbiology	3	0	0	0	0	0	0
FHA000C	Environmental Legislation 1	3	0	0	0	0	0	0
FHA000C	Basics of Enterprises Resource Planning Systems - SAP	4	0	0	0	0	0	0
FHA000C	Basics of Environmental Engineering	3	0	0	0	0	0	0
FHA000C	Chemistry	0	3	0	0	0	0	0
FHA000C	Site Surveying	0	3	0	0	0	0	0
FHA000C	Mechanics	3	0	0	0	0	0	0
FHA000C	Building Construction	0	3	0	0	0	0	0
FHA000C	Ecology	3	0	0	0	0	0	0
FHA000C	Geology	3	0	0	0	0	0	0

FHA000C	Reporting in English	3	0	0	0	0	0	0
FHA000C	Municipal Engineering	0	3	0	0	0	0	0
FHA000C	Strength of Materials	0	3	0	0	0	0	0
FHA000C	Work Placement	30	0	0	0	0	0	0
FHA000C	Building Construction 2	3	0	0	0	0	0	0
FHA000C	Working Finnish	0	6	0	0	0	0	0
FHA000C	Geology	0	3	0	0	0	0	0
FHA000C	Waste Management Systems	0	3	0	0	0	0	0
FHA000C	Elementary German 1	0	3	0	0	0	0	0
FHA000C	Elementary German 2	3	0	0	0	0	0	0
FHA000C	Microbiology	3	0	0	0	0	0	0
FHA000C	Environmental Chemistry 1	0	3	0	0	0	0	0
FHA000C	Environmental Legislation 1	3	0	0	0	0	0	0
FHA000C	Energy Economics	0	3	0	0	0	0	0
FHA000C	Process Technology	3	0	0	0	0	0	0
FHA000C	Environmental Health care	0	3	0	0	0	0	0
FHA000C	Worldwide Environmental Problems	4	0	0	0	0	0	0
FHA000C	Waste Water Treatment	3	0	0	0	0	0	0
FHA000C	Water Supply and Water Treatment	0	3	0	0	0	0	0
FHA000C	Basics of Landscape Construction	0	3	0	0	0	0	0
FHA000C	GIS-applications	0	3	0	0	0	0	0
FHA000C	Complementary Building Design	0	4	0	0	0	0	0
FHA000C	Waste Management Systems	0	3	0	0	0	0	0
FHA000C	BIM in the Structural Engineering	3	0	0	0	0	0	0
FHA000C	Steel Construction Design	0	6	0	0	0	0	0
FHA000C	Water Treatment Processes	3	0	0	0	0	0	0
FHA000C	Water Treatment and Sewerage Systems for Sparsely Populated Areas	3	0	0	0	0	0	0
FHA000C	Planning of Rehabilitation	0	3	0	0	0	0	0
FHA000C	Areal Planning for Waste Management	0	3	0	0	0	0	0
FHA000C	Field Screening Techniques and Laboratory Works	0	3	0	0	0	0	0
FHA000C	Environmental Chemistry 1	0	3	0	0	0	0	0
FHA000C	Environmental Chemistry 2	3	0	0	0	0	0	0
FHA000C	Energy Economics	0	3	0	0	0	0	0
FHA000C	Process Technology	0	3	0	0	0	0	0
FHA000C	Environmental Economics	3	0	0	0	0	0	0
FHA000C	Site Supervision	0	5	0	0	0	0	0
FHA000C	Hydrology and Groundwater Geology	3	0	0	0	0	0	0
FHA000C	Water Protection, Waste Water Treatment	0	3	0	0	0	0	0
FHA000C	Cost Estimating	0	6	0	0	0	0	0
FHA000C	Procurement	0	6	0	0	0	0	0

FHA000C	Quality Development Tools	4	0	0	0	0	0	0
FHA000C	Construction and Project Management	3	0	0	0	0	0	0
FHA000C	Industrial Water Management	3	0	0	0	0	0	0
FHA000C	Environmental Economic	3	0	0	0	0	0	0
FHA000C	Water Protection and Waste Water Treatment	0	3	0	0	0	0	0
FHA000C	Planning of Water Supply and Sewerage systems	3	0	0	0	0	0	0
FHA000C	Water Supply and Water Treatment Technology	3	0	0	0	0	0	0
FHA000C	Management Systems	5	0	0	0	0	0	0
FHA000C	Life Cycle Assessment and Product Development	3	0	0	0	0	0	0
FHA000C	Waste Management Processes	3	0	0	0	0	0	0
FHA000C	Waste Management Processes	3	0	0	0	0	0	0
FHA000C	Water Supply and Sewerage maintenance	3	0	0	0	0	0	0
FHA000C	Machine Dynamics	4	0	0	0	0	0	0
FHA000C	Welding Technology	0	3	0	0	0	0	0
FHA000C	Sheet Metal Works	0	3	0	0	0	0	0
FHA000C	Heat Treatments	0	3	0	0	0	0	0
FHA000C	Laser Technology	0	3	0	0	0	0	0
FHA000C	Mechanical Engineering Measurements	3	0	0	0	0	0	0
FHA000C	Bioprocess Applications	0	3	0	0	0	0	0
FHA000C	Process Design	0	5	0	0	0	0	0
FHA000C	Ice Cream and Special Products	0	3	0	0	0	0	0
FHA000C	Cereal and Mill Technology	0	7	0	0	0	0	0
FHA000C	Biometry and Statistical Methods	0	3	0	0	0	0	0
FHA000C	Brewing Technology	0	8	0	0	0	0	0
FHA000C	Edible Fats	5	0	0	0	0	0	0
FHA000C	Ice Cream and Special Products	0	3	0	0	0	0	0
FHA000C	Powders and Whey Products	0	6	0	0	0	0	0
FHA000C	Operations and Project Management	0	3	0	0	0	0	0
FHA000C	Water Chemistry	3	0	0	0	0	0	0
FHA000C	Mechanical and Equipment Technology	3	0	0	0	0	0	0
FHA000C	Process Measurements	0	3	0	0	0	0	0
FHA000C	Basics of Process Technology	0	3	0	0	0	0	0
FHA000C	Biochemistry	0	3	0	0	0	0	0
FHA000C	Food and Packaging Technology	5	0	0	0	0	0	0
FHA000C	Process Technology	0	6	0	0	0	0	0
FHA000C	Product Development	4	0	0	0	0	0	0
FHA000C	Business and Production Economy	0	3	0	0	0	0	0
FHA000C	Building Automation	5	0	0	0	0	0	0
FHA000C	Programming	4	0	0	0	0	0	0
FHA000C	Electrical Design	0	4	0	0	0	0	0

FHA000C	Basics of Meat Technology	0	5	0	0	0	0	0
FHA000C	Fermented Milk Products	0	6	0	0	0	0	0
FHA000C	Vehicle and Transport Technologies	0	3	0	0	0	0	0
FHA000C	Chemistry	3	0	0	0	0	0	0
FHA000C	Basics of Traffic Planning	4	0	0	0	0	0	0
FHA000C	Traffic Safety	0	4	0	0	0	0	0
FHA000C	Transport Modes	0	3	0	0	0	0	0
FHA000C	Engineering Physics	0	3	0	0	0	0	0
FHA000C	Computer Based Mathematics	0	3	0	0	0	0	0
FHA000C	Traffic Legislation	3	0	0	0	0	0	0
FHA000C	Project Management in the Traffic Sector	0	3	0	0	0	0	0
FHA000C	Traffic Planning Software	3	0	0	0	0	0	0
FHA000C	Physics Labs	0	3	0	0	0	0	0
FHA000C	Mechanical and Automation Engineering	0	4	0	0	0	0	0
FHA000C	Environmental Technology	0	4	0	0	0	0	0
FHA000C	Logistics	0	3	0	0	0	0	0
FHA000C	Computer-aided Design	0	3	0	0	0	0	0
FHA000C	Pollution Control in Industrial Processes	3	0	0	0	0	0	0
FHA000C	Elementary German 2	3	0	0	0	0	0	0
FHA000C	Business German 1	3	0	0	0	0	0	0
FHA000C	Water Treatment and Sewerage Systems for Sparsely Populated Areas	0	5	0	0	0	0	0
FHA000C	Traffic Policy and Traffic Systems	0	4	0	0	0	0	0
FHA000C	Elementary German 1	0	3	0	0	0	0	0
FHA000C	Machining	0	3	0	0	0	0	0
FHA000C	Chemistry 2	0	3	0	0	0	0	0
FHA000C	Biotechnology	0	3	0	0	0	0	0
FHA000C	Mathematics 1	0	3	0	0	0	0	0
FHA000C	Environmental Legislation 2	3	0	0	0	0	0	0
FHA000C	Basics of Smart Traffic	3	0	0	0	0	0	0
FHA000C	Water Resources, Water Treatment Technology	3	0	0	0	0	0	0
FHA000C	Mechanics 2	0	6	0	0	0	0	0
FHA000C	Economics of the Construction Industry	3	0	0	0	0	0	0
FHA000C	Structural Engineering 1	4	0	0	0	0	0	0
FHA000C	Basics in working german	0	3	0	0	0	0	0
FLM000C	Utilising biodegradable waste	0	3	0	0	0	0	0
FLM000C	Processing and utilisation of waste water	0	5	0	0	0	0	0
FHA000C	Project: Information Management Plan	0	3	0	0	0	0	0
FHA000C	Project: Integration of Automation and Information systems	0	6	0	0	0	0	0
FHA000C	Project: Development of Automation Production System	0	6	0	0	0	0	0
FHA000C	Seeing Finland through Culture	0	3	0	0	0	0	0

FHA000C	Finnish Language and Culture	0	3	0	0	0	0	0
FLM000C	Professional growth	0	3	0	0	0	0	0
FLM000C	English for energy experts	0	3	0	0	0	0	0
FLM000C	Energy Counselling	3	0	0	0	0	0	0
FLM000C	Inorganic and organic chemistry	6	0	0	0	0	0	0
FLM000C	Environmental Project	0	10	0	0	0	0	0
FLM000C	Energy efficiency in buildings	3	0	0	0	0	0	0
FLM000C	Introduction to Bachelor's Thesis and seminar work	0	4	0	0	0	0	0
FLM000C	Land and water ecosystems	0	6	0	0	0	0	0
FLM000C	Environmental technology project 1	0	6	0	0	0	0	0
FLM000C	Environmental technology project 2	0	5	0	0	0	0	0
FLM000C	Intensive week in Russia	3	0	0	0	0	0	0
FLM000C	Foundation course in chemistry and physics	0	4	0	0	0	0	0
FLM000C	Mathematics Basics	0	3	0	0	0	0	0
FLM000C	Electricity and Wave Motion	0	3	0	0	0	0	0
FLM000C	ICT SKILLS I	0	3	0	0	0	0	0
FLM000C	Energy Efficiency in Community Structure	0	3	0	0	0	0	0
FLM000C	Research Methods and Seminar Work	5	0	0	0	0	0	0
FLM000C	Image Processing (Photoshop)	0	3	0	0	0	0	0
FLM000C	Development of centres	5	0	0	0	0	0	0
FLM000C	Visual communication	0	3	0	0	0	0	0
FLM000C	Waste disposal and planning and supervision of landfills	3	0	0	0	0	0	0
FLM000C	Traffic in urban planning	5	0	0	0	0	0	0
FLM000C	Material recycling as business	3	0	0	0	0	0	0
FLM000C	Surveying, Mapping and Real Estate Formation	0	3	0	0	0	0	0
FLM000C	Novapoint design software	0	3	0	0	0	0	0
FLM000C	Process planning and scaling	4	0	0	0	0	0	0
FLM000C	English for urban planning	0	3	0	0	0	0	0
FLM000C	Equipment solutions for renewable energy	0	3	0	0	0	0	0
FLM000C	Business and renewable energy	3	0	0	0	0	0	0
FLM000C	Waste management of a company or public organization	3	0	0	0	0	0	0
FLM000C	Master planning	0	6	0	0	0	0	0
FLM000C	Environmental Geotechnology and Earth Construction	0	3	0	0	0	0	0
FLM000C	English for environmental protection technology	0	3	0	0	0	0	0
FLM000C	Commercial Mathematics in Environmental Planning	0	3	0	0	0	0	0
FLM000C	Thermology and Transport Mechanisms	0	3	0	0	0	0	0
FLM000C	Novapoint	0	3	0	0	0	0	0
FLM000C	Vectors and Matrices	0	3	0	0	0	0	0
FLM000C	Archicad	3	0	0	0	0	0	0

FLM000C	Biomasses and biowastes and their use for energy	4	0	0	0	0	0	0
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FLM000C	Street engineering	5	0	0	0	0	0	0
FLM000C	Clean water and sanitation	3	0	0	0	0	0	0
FLM000C	Renewable energy project	6	0	0	0	0	0	0
FHA000C	Maintenance of Water Supply Networks	3	0	0	0	0	0	0
FHA000C	Environmental and Safety Risks	3	0	0	0	0	0	0
FHA000C	Basics of Environmental Technology	3	0	0	0	0	0	0
FLM000C	Physics and Chemistry Basics	0	3	0	0	0	0	0
FLM000C	Vectors and matrixes	0	3	0	0	0	0	0
FLM000C	ICT Skills	0	3	0	0	0	0	0
FLM000C	Strength of materials 1	0	3	0	0	0	0	0
FLM000C	Logistics and production control	0	3	0	0	0	0	0
FLM000C	Basics of materials science	0	4	0	0	0	0	0
FLM000C	Basic course in marketing	0	3	0	0	0	0	0
FLM000C	Electrical engineering and automation	3	0	0	0	0	0	0
FLM000C	Industrial automation 1	0	4	0	0	0	0	0
FLM000C	Occupational safety and safe use of machines	0	4	0	0	0	0	0
FLM000C	Entrepreneurship studies	0	4	0	0	0	0	0
FLM000C	CNC machining	0	3	0	0	0	0	0
FLM000C	Furniture technology	0	3	0	0	0	0	0
FLM000C	Project 2 - Product development and marketing	0	5	0	0	0	0	0
FLM000C	Project 3 - Research and development	0	5	0	0	0	0	0
FLM000C	Drying and heat treatment of wood	0	3	0	0	0	0	0
FLM000C	Production of wood constructions	0	3	0	0	0	0	0
FLM000C	Mechanical engineering lab course	0	3	0	0	0	0	0
FLM000C	Plastics engineering lab	4	0	0	0	0	0	0
FLM000C	Plastics processing techniques	0	4	0	0	0	0	0
FLM000C	Mould technology	0	3	0	0	0	0	0
FLM000C	Finishing plastic products	2	0	0	0	0	0	0
FLM000C	Project 2	4	0	0	0	0	0	0
FLM000C	Engineering design 3D CAD	0	4	0	0	0	0	0
FLM000C	Shape and structure of flexible clothes	0	3	0	0	0	0	0
FLM000C	Structure and marketing of a collection	0	5	0	0	0	0	0
FLM000C	Computer-aided pattern making	5	0	0	0	0	0	0
FLM000C	English for clothing and textile technology	3	0	0	0	0	0	0
FLM000C	Purchasing in the clothing industry	6	0	0	0	0	0	0
FLM000C	Clothing industry production project	6	0	0	0	0	0	0
FLM000C	Production planning in the clothing industry	0	4	0	0	0	0	0
FLM000C	Making patterns for production	0	3	0	0	0	0	0
FLM000C	Business English	3	0	0	0	0	0	0
FLM000C	Plastic film technology	3	0	0	0	0	0	0
FLM000C	Learning and professional growth	0	3	0	0	0	0	0

FHA000C	Intercultural Communication Today	5	0	0	0	0	0	0
FHA000C	Construction Management	5	0	0	0	0	0	0
FHA000C	Leadership and Management in Practice (RYLA seminars)	3	0	0	0	0	0	0
FHA000C	Project Management (FUAS Innovation School)	2	0	0	0	0	0	0
FHA000C	Entrepreneurship and Innovation (FUAS Innovation School)	4	0	0	0	0	0	0
FHA000C	Information Search and Processing (FUAS Innovation School)	2	0	0	0	0	0	0
FHA000C	Development project - Mechanical Engineering (FUAS Innovation School)	7	0	0	0	0	0	0
FHA000C	Reliability Centred Maintenance	0	4	0	0	0	0	0
FLM000C	Differential and integral calculus I	3	0	0	0	0	0	0
FHA0001	Software Development Project - Information Technology (FUAS Innovation School)	7	0	0	0	0	0	0
FHA0001	Traffic Planning Project - Traffic (FUAS Innovation School)	7	0	0	0	0	0	0
FLM000C	Energy counselling	3	0	0	0	0	0	0
FLM000C	Energy efficiency in the community structure	0	3	0	0	0	0	0
FHA0001	Technology Application in Automation	4	0	0	0	0	0	0
FHA0001	Development project - Engineering (FUAS Innovation School)	7	0	0	0	0	0	0
FLM000C	Energy Efficiency in Buildings	3	0	0	0	0	0	0
FHA0001	Food Hygiene	1	0	0	0	0	0	0
FHA0001	Food Hygiene	1	0	0	0	0	0	0
FHA0001	Applied Mathematics	0	3	0	0	0	0	0
FHA0001	Control Engineering	4	0	0	0	0	0	0
FHA0001	Fieldbus Technology	0	3	0	0	0	0	0
FHA0001	Maintenance Economics	0	4	0	0	0	0	0
FHA0001	Human Machine Interface	0	4	0	0	0	0	0
FHA0001	Networks in Automation	4	0	0	0	0	0	0
FHA0001	Robotics	0	4	0	0	0	0	0
FHA0001	Machine Vision	0	3	0	0	0	0	0
FHA0001	Reliability Centered Maintenance	4	0	0	0	0	0	0
FHA0001	Maintenance Information Systems	0	4	0	0	0	0	0
FLM000C	Application of environmental legislation	5	0	0	0	0	0	0
FHA0001	Bid-Supply Chain Management	0	5	0	0	0	0	0
FHA0001	Leadership	0	6	0	0	0	0	0
FHA0001	Commercial and Personnel Agreements	0	4	0	0	0	0	0
FHA0001	Industrial Maintenance	5	0	0	0	0	0	0
FHA0001	Industrial Service Business Concepts	5	0	0	0	0	0	0
FHA0001	Industrial Marketing Operations	4	0	0	0	0	0	0
FHA0001	Productional Network Management and Sourcing	0	5	0	0	0	0	0
FHA0001	Product Development and Life-Cycle Management	5	0	0	0	0	0	0
FHA0001	Digital Product Process Management	5	0	0	0	0	0	0

FHA0001	Business Operation Management	0	5	0	0	0	0	0
FHA0001	Basics of Structural Engineering 2	0	4	0	0	0	0	0
FHA0000	Industrial utilization of waste	0	3	0	0	0	0	0
FHA0001	Industrial Utilization of Waste	0	3	0	0	0	0	0
FHA0001	Brush up your Finnish	3	0	0	0	0	0	0
FHA0001	Air Quality Management	3	0	0	0	0	0	0
FHA0001	Environment Rehabilitation	3	0	0	0	0	0	0
FHA0001	International Climate Politics	3	0	0	0	0	0	0
FHA0001	Pollution Control in Industrial Processes	3	0	0	0	0	0	0
FHA0000	Construction and Project Management	3	0	0	0	0	0	0
FHA0001	Industrial Water Management	3	0	0	0	0	0	0
FHA0001	Environmental and Quality Management Systems	0	5	0	0	0	0	0
FHA0001	Environmental and Safety Risks	3	0	0	0	0	0	0
FHA0001	Life Cycle Assessment and Product Ecodesign	3	0	0	0	0	0	0
FHA0001	Planning of Water Supply and Sewerage Systems	3	0	0	0	0	0	0
FHA0001	Complementary Building Design	0	4	0	0	0	0	0
FHA0001	Mechanics 2	0	6	0	0	0	0	0
FHA0001	Realisation Plans	3	0	0	0	0	0	0
FHA0001	Road Structures and Maintaining	3	0	0	0	0	0	0
FHA0001	Land Use Planning	3	0	0	0	0	0	0
FHA0001	Construction management	0	10	0	0	0	0	0
FHA0001	Project Work	0	5	0	0	0	0	0
FHA0001	Installations of Building Services	0	3	0	0	0	0	0
FHA0001	Cost Estimating	0	4	0	0	0	0	0
FHA0001	Thesis	15	0	0	0	0	0	0
FHA0001	Geotechnical Engineering	0	3	0	0	0	0	0
FHA0001	Structural Steel Design 1	6	0	0	0	0	0	0
FHA0001	Building Physics	3	0	0	0	0	0	0
FHA0001	Structural Engineering 2	0	3	0	0	0	0	0
FHA0001	Structural Engineering 3	3	0	0	0	0	0	0
FHA0001	Renovation 1	0	3	0	0	0	0	0
FHA0001	Building Construction 3	0	3	0	0	0	0	0
FHA0001	Renovation 2	3	0	0	0	0	0	0
FHA0001	Building Services, Electrical Installations	3	0	0	0	0	0	0
FHA0001	Structural Steel Design 2	6	0	0	0	0	0	0
FHA0001	Management and Leadership, Managing Across Cultures	0	4	0	0	0	0	0
FHA0001	Life Cycle Assessment and Product Ecodesign	0	3	0	0	0	0	0
FHA0001	Environmental Chemistry 2	5	0	0	0	0	0	0
FHA0001	Environmental Legislation 2	0	3	0	0	0	0	0
FHA0001	Construction and Project Management	0	3	0	0	0	0	0
FHA0001	Planning of Water Supply and Sewerage Systems	0	3	0	0	0	0	0

FHA0001	Air Quality Management	0	3	0	0	0	0	0
FHA0001	Waste Treatment Processes	3	0	0	0	0	0	0
FHA0001	Remediation of Contaminated Soils and Waters	0	3	0	0	0	0	0
FHA0001	Environmental and Quality Management systems	3	0	0	0	0	0	0
FHA0001	Environmental Legislation 2	0	3	0	0	0	0	0
FHA0001	Planning of Water Supply and Sewerage Systems	0	3	0	0	0	0	0
FHA0001	Air Quality Management	0	3	0	0	0	0	0
FHA0001	Waste Treatment Processes	0	3	0	0	0	0	0
FHA0001	Environmental Geology	0	3	0	0	0	0	0
FHA0001	Finite Element Methods for Mechanical Engineers	0	5	0	0	0	0	0
FHA0001	Applied Electronics	5	0	0	0	0	0	0
FHA0001	Identification Techniques	0	4	0	0	0	0	0
FHA0001	Transportation Equipment and Telematics	0	5	0	0	0	0	0
FHA0001	Supply Chain Management	0	4	0	0	0	0	0
FHA0001	Procurement	4	0	0	0	0	0	0
FHA0001	Fieldbus Technology	3	0	0	0	0	0	0
FHA0001	Thesis	0	15	0	0	0	0	0
FHA0001	Control Engineering	4	0	0	0	0	0	0
FHA0001	Maintenance Economics	0	4	0	0	0	0	0
FHA0001	Maintenance Information Systems	4	0	0	0	0	0	0
FHA0001	Maintenance Project Work	3	0	0	0	0	0	0
FHA0001	User Interface Design and Usability Evaluation	0	4	0	0	0	0	0
FHA0001	Future of Food Industry	0	5	0	0	0	0	0
FHA0000	Environmental Geology	3	0	0	0	0	0	0
FHA0001	Maintenance Project	3	0	0	0	0	0	0
FHA0001	Graduation Thesis	15	0	0	0	0	0	0
FHA0001	Building Services, HVAC	0	3	0	0	0	0	0
FLM0000	Automation Design Basics	0	6	0	0	0	0	0
FLM0000	Physics Basics	0	3	0	0	0	0	0
FLM0000	Machining and Welding Basics	0	3	0	0	0	0	0
FLM0000	Mathematics Basics	0	3	0	0	0	0	0
FLM0000	Mechanical Design Basics	0	5	0	0	0	0	0
FLM0000	Orientation Studies	3	0	0	0	0	0	0
FLM0000	Electrical Engineering and Electronics Basics	3	0	0	0	0	0	0
FLM0000	Technical Drawing	0	4	0	0	0	0	0
FLM0000	Supplementary studies in Finnish	0	3	0	0	0	0	0
FLM0000	Data acquisition systems and modular logics	0	4	0	0	0	0	0
FLM0000	Quality engineering	0	4	0	0	0	0	0
FLM0000	Project 1	0	5	0	0	0	0	0
FLM0000	Designing plastic products	0	2	0	0	0	0	0

FLM0001	Project 4	0	5	0	0	0	0	0
FLM0001	Plastic composites	0	3	0	0	0	0	0
FLM0001	Project 3	0	5	0	0	0	0	0
FHA0001	Hydraulics and Pneumatics in Automation	0	4	0	0	0	0	0
FHA0001	Enterprise Resource Planning System	0	5	0	0	0	0	0
FHA0001	Pneumatiikka ja hydraulikka	0	3	0	0	0	0	0
FLM0001	Physics for information technology	0	4	0	0	0	0	0
FLM0001	Physics for mechatronics	0	5	0	0	0	0	0
FLM0001	Strength of Materials	0	3	0	0	0	0	0
FLM0001	Programming Basics (C language)	0	3	0	0	0	0	0
FLM0001	Continuation course in electrical design (safety engineering)	0	3	0	0	0	0	0
FLM0001	Field Buses and HMI Systems in the PLC Environment	0	3	0	0	0	0	0
FLM0001	Plant layout planning 1	0	3	0	0	0	0	0
FLM0001	Position control	0	4	0	0	0	0	0
FLM0001	Pneumatics	0	3	0	0	0	0	0
FLM0001	Mechanical design 2	0	5	0	0	0	0	0
FLM0001	Personnel	0	3	0	0	0	0	0
FLM0001	Energy and maintenance	0	4	0	0	0	0	0
FLM0001	Strength of materials 3	0	3	0	0	0	0	0
FLM0001	Product design 3D modelling	0	3	0	0	0	0	0
FLM0001	Supervised training 2	0	12	0	0	0	0	0
FLM0001	Hydraulics 2	0	2	0	0	0	0	0
FLM0001	Accounting and purchasing	0	2	0	0	0	0	0
FLM0001	Marketing	0	2	0	0	0	0	0
FLM0001	Mechanical design 3	0	4	0	0	0	0	0
FLM0001	Mechanical design 4	0	3	0	0	0	0	0
FLM0001	Measuring techniques and troubleshooting	0	2	0	0	0	0	0
FLM0001	Material and manufacturing technology 2	0	2	0	0	0	0	0
FLM0001	Material and manufacturing technology 3	0	3	0	0	0	0	0
FLM0001	ThesisThesis	0	15	0	0	0	0	0
FLM0001	Patents, design	0	2	0	0	0	0	0
FLM0001	CAM	0	3	0	0	0	0	0
FLM0001	Production control	0	3	0	0	0	0	0
FLM0001	Supplementary studies in English	0	3	0	0	0	0	0
FLM0001	PC control methods	0	3	0	0	0	0	0
FLM0001	English for media technology	0	3	0	0	0	0	0
FLM0001	Spoken English	0	3	0	0	0	0	0
FLM0001	Swedish	0	3	0	0	0	0	0
FLM0001	Hazardous materials	5	0	0	0	0	0	0
FLM0001	Water and waste water treatment	5	0	0	0	0	0	0

FLM0001	Land and Water Ecosystems	0	6	0	0	0	0	0
FLM0001	Learning and Professional Growth	0	2	0	0	0	0	0
FLM0001	User interface programming	0	5	0	0	0	0	0
FLM0001	Application development workshop	0	5	0	0	0	0	0
FLM0001	Image Processing	0	3	0	0	0	0	0
FLM0001	Basics of Databases	0	3	0	0	0	0	0
FLM0001	Object Oriented Programming	0	4	0	0	0	0	0
FLM0001	Environmental ICT project 3	0	3	0	0	0	0	0
FLM0001	National and International Development Cooperation	0	5	0	0	0	0	0
FLM0001	Working and communication in developing countries	0	5	0	0	0	0	0
FLM0001	Application of environmental legislation	0	3	0	0	0	0	0
FHA0001	Basics of Enterprises Resource Planning Systems - SAP	4	0	0	0	0	0	0
FHA0001	Multicultural Leadership	3	0	0	0	0	0	0
FHA0001	Development Project - Engineering (FUAS Innovation School)	9	0	0	0	0	0	0
FHA0001	Special Issues In Food industry	3	0	0	0	0	0	0
FHA0001	Consumer Behavior In Food Industry	3	0	0	0	0	0	0
FHA0001	Nutrition In Food Industry	3	0	0	0	0	0	0
FLM0001	Co-designing Better Urban Living	5	0	0	0	0	0	0
FHA0001	Basics of Physics in Construction	0	3	0	0	0	0	0
FLM0001	Environmental Project	6	0	0	0	0	0	0
FLM0001	Thesis	15	0	0	0	0	0	0
FLM0001	Visualization workshop II	5	0	0	0	0	0	0
FLM0001	Game Programming Essentials	5	0	0	0	0	0	0
FLM0001	Green ICT Systems Project	4	0	0	0	0	0	0
FLM0001	Radio systems	4	0	0	0	0	0	0
FLM0001	Radio technology and radio links	4	0	0	0	0	0	0
FLM0001	Research work	5	0	0	0	0	0	0
FLM0001	Data structures and algorithms	3	0	0	0	0	0	0
FLM0001	Programmable circuits	4	0	0	0	0	0	0
FLM0001	Networking Fundamentals	5	0	0	0	0	0	0
FLM0001	Green ICT Systems Project	4	0	0	0	0	0	0
FLM0001	Applied ICT mathematics	3	0	0	0	0	0	0
FLM0001	Software architectures	5	0	0	0	0	0	0
FLM0001	Software development project	3	0	0	0	0	0	0
FLM0001	Microprocessors in embedded systems	4	0	0	0	0	0	0
FLM0001	Research project in telecommunications technology	5	0	0	0	0	0	0
FLM0001	Network management systems	4	0	0	0	0	0	0
FLM0001	Electricity and wave motion	3	0	0	0	0	0	0
FLM0001	Scientific Writing	2	0	0	0	0	0	0
FLM0000	Research process and research methods	0	5	0	0	0	0	0

FLM0001	Master's Thesis	0	30	0	0	0	0	0
FHA0001	Food Security and Food Safety	3	0	0	0	0	0	0
FLM0001	Entrepreneurship and innovation	3	0	0	0	0	0	0
FHA0001	Traffic Safety and Psychology	5	0	0	0	0	0	0
FHA0001	Basics of Urban Planning	5	0	0	0	0	0	0
FHA0001	Basics of Road Design	5	0	0	0	0	0	0
FHA0001	Tools for Project Work (FUAS Innovation School)	6	0	0	0	0	0	0
FHA0001	Tools for Business Concepts (FUAS Innovation School)	3	0	0	0	0	0	0
FHA0001	Development Project - Mechanical Engineering (FUAS Innovation School)	9	0	0	0	0	0	0
FHA0001	Traffic Planning Project - Traffic (FUAS Innovation School)	9	0	0	0	0	0	0
FHA0001	Software Development Project - Information Technology (FUAS Innovation School)	9	0	0	0	0	0	0
FHA0001	Advanced Development Project - Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FLM0001	Project on improving energy efficiency	3	0	0	0	0	0	0
FLM0001	Life cycle and material efficiency project	3	0	0	0	0	0	0
FHA0001	Advanced Development project - Mechanical Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Advanced Traffic Planning Project - Traffic (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Advanced Software Development Project - Information Technology (FUAS Innovation School)	12	0	0	0	0	0	0
FLM0001	3D printing	3	0	0	0	0	0	0
FLM0001	Communicating Your Expertise	3	0	0	0	0	0	0
FLM0001	PLC-programming (Siemens)	3	0	0	0	0	0	0
FLM0001	Physics Labs	3	0	0	0	0	0	0
FLM0001	Environmental legislation, part 1	3	0	0	0	0	0	0
FLM0001	Environmental legislation, part 2	2	0	0	0	0	0	0
FHA0001	Development Project - Construction Engineering (FUAS Innovation School)	9	0	0	0	0	0	0
FLM0001	Co-designing Better Urban Living	5	0	0	0	0	0	0
FLM0001	Information Literacy	1	0	0	0	0	0	0
FHA0001	Fluent Finnish	0	5	0	0	0	0	0
FHA0001	Basic Course in Russian 1	0	3	0	0	0	0	0
FHA0001	Communication skills in Working German	3	0	0	0	0	0	0
FHA0001	Basic Course in Russian 2	3	0	0	0	0	0	0
FHA0001	Basics of Nutrition	3	0	0	0	0	0	0
FLM0001	Improving Energy Efficiency - Project	3	0	0	0	0	0	0
FLM0001	Rural Water Resources Management, Remediation and Construction	3	0	0	0	0	0	0
FLM0001	Energy Production and Renewable Energy	6	0	0	0	0	0	0
FLM0001	Swedish, written	1,5	0	0	0	0	0	0
FLM0001	Swedish, spoken	1,5	0	0	0	0	0	0

FLM0001	Built Environment and Communities	0	4	0	0	0	0	0
FLM0001	Professional English	3	0	0	0	0	0	0
FLM0001	Field Work, Measurements and Site Supervision	3	0	0	0	0	0	0
FLM0001	Waste water treatment and its utilization	3	0	0	0	0	0	0
FLM0001	Chemistry and Laboratory Analysis in Environmental research	0	3	0	0	0	0	0
FLM0001	Mathematical Statistics 2	3	0	0	0	0	0	0
FLM0001	Digital Technology Basics	0	3	0	0	0	0	0
FLM0001	Hydraulics Basics	0	3	0	0	0	0	0
FLM0001	Physics for Mechatronics	3	0	0	0	0	0	0
FLM0001	Mechanical Design Advanced Course	0	3	0	0	0	0	0
FLM0001	Measuring and Control Technology Basics	3	0	0	0	0	0	0
FLM0001	Material and Manufacturing Technology Basics	4	0	0	0	0	0	0
FLM0001	Materials and Manufacturing Technology Advanced Course	0	3	0	0	0	0	0
FLM0001	Project Course 1	9	0	0	0	0	0	0
FLM0001	Project Course 2	0	7	0	0	0	0	0
FLM0001	Project 4	0	8	0	0	0	0	0
FLM0001	Positioning Control	0	3	0	0	0	0	0
FLM0001	Pneumatics Basics	0	3	0	0	0	0	0
FLM0001	Robotics Basics	3	0	0	0	0	0	0
FLM0001	Electric Motor Drives	5	0	0	0	0	0	0
FLM0001	Basics of control engineering	2	0	0	0	0	0	0
FLM0001	SolidWorks Basics	0	3	0	0	0	0	0
FLM0001	Manufacturing methods	3	0	0	0	0	0	0
FLM0001	Project 3	0	7	0	0	0	0	0
FLM0001	Energy Efficiency	3	0	0	0	0	0	0
FLM0001	Material Efficiency, Recycling and Waste Management	3	0	0	0	0	0	0
FLM0001	Environmental Issues in the Management and Environmental Quality Systems	3	0	0	0	0	0	0
FLM0001	Environmental Legislation Concerning Companies	3	0	0	0	0	0	0
FLM0001	English for wood technology	0	3	0	0	0	0	0
FLM0001	Surface finishing	3	0	0	0	0	0	0
FLM0001	Designing wood constructions	4	0	0	0	0	0	0
FLM0001	Joinery technology	0	3	0	0	0	0	0
FLM0001	Plywood technology	3	0	0	0	0	0	0
FLM0001	Custom-made patterns and 3D modelling	3	0	0	0	0	0	0
FLM0001	Structures and manufacture of special clothing	3	0	0	0	0	0	0
FLM0001	Writing reports and abstracts	3	0	0	0	0	0	0
FLM0001	Differential and Integral Calculus	3	0	0	0	0	0	0
FLM0001	Physics labs	3	0	0	0	0	0	0
FLM0001	Geometry and Trigonometry	3	0	0	0	0	0	0

FLM0001	3D-CAD Design	0	3	0	0	0	0	0
FLM0001	Vectors and Matrices	0	3	0	0	0	0	0
FLM0001	CNC and CAM Technology	5	0	0	0	0	0	0
FLM0001	Board technology	0	3	0	0	0	0	0
FLM0001	Drying and Heat Treatment of Wood	0	3	0	0	0	0	0
FLM0001	Residential Environments Project	5	0	0	0	0	0	0
FLM0001	Product development project in the clothing industry	3	0	0	0	0	0	0
FLM0001	Life Cycle Analysis	3	0	0	0	0	0	0
FHA0001	Entrepreneurship-attitude and action	3	0	0	0	0	0	0
FHA0001	Quality Management and control	5	0	0	0	0	0	0
FHA0001	B2B-marketing and sales	5	0	0	0	0	0	0
FHA0001	Leading organization and related finance	5	0	0	0	0	0	0
FLM0001	Community Planning /LAMK - Lahti UAS	5	0	0	0	0	0	0
FLM0001	Management	0	3	0	0	0	0	0
FLM0001	Strength of Materials 1	3	0	0	0	0	0	0
FLM0001	Thermology	3	0	0	0	0	0	0
FLM0001	Mechanics	0	3	0	0	0	0	0
FLM0001	Material Science Basics	0	5	0	0	0	0	0
FLM0001	Electrical Engineering and Automation	3	0	0	0	0	0	0
FLM0001	Industrial automation 2	4	0	0	0	0	0	0
FLM0001	Scientific Writing	0	1	0	0	0	0	0
FLM0001	Technical Drawing Basics	0	3	0	0	0	0	0
FLM0001	Business economics	2	0	0	0	0	0	0
FLM0001	Furniture Technology	0	4	0	0	0	0	0
FLM0001	Cost calculation	0	3	0	0	0	0	0
FLM0001	Gluing Techniques	3	0	0	0	0	0	0
FLM0001	Gluing techniques	0	3	0	0	0	0	0
FLM0001	Surface Treatment	3	0	0	0	0	0	0
FLM0001	Project 2 – Product Development Project	0	5	0	0	0	0	0
FLM0001	Woodworking and Production Technology	4	0	0	0	0	0	0
FLM0001	Production and Processing of Sawn Goods	0	3	0	0	0	0	0
FLM0001	Technical construction timber products	0	3	0	0	0	0	0
FLM0001	Plant layout planning	0	3	0	0	0	0	0
FLM0001	Finishing and Jointing	3	0	0	0	0	0	0
FLM0001	Properties and Testing Them	5	0	0	0	0	0	0
FLM0001	Polymer Chemistry	0	3	0	0	0	0	0
FLM0001	Product Development Project	0	4	0	0	0	0	0
FLM0001	Product Design	0	3	0	0	0	0	0
FLM0001	Product Development and Research Project	4	0	0	0	0	0	0
FLM0001	Manufacturing Technology	0	5	0	0	0	0	0
FLM0001	Smart Materials	3	0	0	0	0	0	0

FLM0001	Business Mathematics	0	3	0	0	0	0	0
FLM0001	Sustainable Development and Energy Efficiency in Remediation (in situ methods)	3	0	0	0	0	0	0
FLM0001	Urban Water Resources Management and Project	6	0	0	0	0	0	0
FLM0001	Remediation Process	3	0	0	0	0	0	0
FLM0001	STREET AND ROAD PLANNING	5	0	0	0	0	0	0
FLM0001	TRAFFIC SAFETY AND PSYCHOLOGY	5	0	0	0	0	0	0
FHA0001	Industrial Marketing and Purchasing Solutions	0	5	0	0	0	0	0
FHA0001	Geotechnics	0	3	0	0	0	0	0
FHA0001	English for Construction Managers	0	3	0	0	0	0	0
FHA0001	Project	0	4,5	0	0	0	0	0
FHA0001	Construction industry and economics	0	1	0	0	0	0	0
FHA0001	Architecture and Construction	0	2	0	0	0	0	0
FHA0001	Building Materials	0	2	0	0	0	0	0
FHA0001	Studying in HAMK	0	3	0	0	0	0	0
FHA0001	Development Project - Engineering (FUAS Innovation School)	0	3	0	0	0	0	0
FHA0001	Advanced Development project - Engineering (FUAS Innovation School)	0	4	0	0	0	0	0
FHA0001	Basics in Construction Chemistry	0	3	0	0	0	0	0
FHA0001	Occupational Safety	0	3	0	0	0	0	0
FHA0001	Production planning & control	5	0	0	0	0	0	0
FHA0001	Process Management	5	0	0	0	0	0	0
FHA0001	Supply Chain Management	5	0	0	0	0	0	0
FHA0001	Purchasing	5	0	0	0	0	0	0
FHA0001	Service Business B2B	5	0	0	0	0	0	0
FHA0001	Basics of business operations	3	0	0	0	0	0	0
FHA0001	Tools for Project Work (FUAS Innovation School)	3	0	0	0	0	0	0
FHA0001	Development Project - Mechanical Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Traffic Planning Project - Traffic (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Software Development Project - Information Technology (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Development Project - Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Development Project - Construction Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0001	Basics of Food Chain Anticipating	3	0	0	0	0	0	0
FLM0001	Environmental Project	0	10	0	0	0	0	0
FHA0001	Structures in low-rise dwelling	3	0	0	0	0	0	0
FHA0001	Basics of CAD	3	0	0	0	0	0	0
FHA0001	Building Services and Energy Efficiency in Houses	2	0	0	0	0	0	0
FHA0001	Statics	2	0	0	0	0	0	0

FHA0001	Basics in Building Physics	2	0	0	0	0	0	0
FHA0001	Concrete structures in low-rise dwelling	3	0	0	0	0	0	0
FHA0001	Schedules of House Project	2	0	0	0	0	0	0
FHA0001	Working Practices of House Project	3	0	0	0	0	0	0
FHA0001	Cost Estimating of House Project	2	0	0	0	0	0	0
FHA0001	Site Surveying	3	0	0	0	0	0	0
FHA0001	Trigonometry, vector, Plane and Space Geometry	3	0	0	0	0	0	0
FHA0001	Basics of Municipal Engineering	2	0	0	0	0	0	0
FLM0001	Co-designing, better urban living and wellbeing	5	0	0	0	0	0	0
FLM0001	AutoCad 2D Design	3	0	0	0	0	0	0
FLM0001	Hazardous Materials	5	0	0	0	0	0	0
FLM0001	Climate Change and Air Pollution	5	0	0	0	0	0	0
FLM0001	Algebra, Geometry and Trigonometry	0	5	0	0	0	0	0
FLM0001	Connecting Networks	0	5	0	0	0	0	0
FLM0001	Professional English	0	3	0	0	0	0	0
FLM0001	Professional English	0	3	0	0	0	0	0
FLM0001	Physics Basics	0	4	0	0	0	0	0
FLM0001	Management and Quality	0	3	0	0	0	0	0
FLM0001	English Language and Communication	0	3	0	0	0	0	0
FLM0001	English Supplementary Studies	0	3	0	0	0	0	0
FLM0001	Marketing	0	3	0	0	0	0	0
FLM0001	English for Mechatronics	0	3	0	0	0	0	0
FLM0001	Scaling Networks	0	5	0	0	0	0	0
FLM0001	Security and Network Management	0	5	0	0	0	0	0
FLM0001	Wood-Based Panels Technology	0	3	0	0	0	0	0
FLM0001	Moulds and Tools	0	3	0	0	0	0	0
FLM0001	Swedish Supplementary Studies	0	3	0	0	0	0	0
FLM0001	Land and Water Ecosystems	0	3	0	0	0	0	0
FLM0001	Applied electronics	0	5	0	0	0	0	0
FLM0001	Mathematical Statistics	0	3	0	0	0	0	0
FLM0001	Mathematical Statistics 1	0	3	0	0	0	0	0
FLM0001	Products for Demanding Conditions	0	3	0	0	0	0	0
FLM0001	Usability Engineering	0	3	0	0	0	0	0
FLM0001	Recycling and Recycled Products	0	3	0	0	0	0	0
FHA0001	Safety in Learning Environment	0	3	0	0	0	0	0
FHA0000	The History, Culture and Concepts of Sexuality	0	3	0	0	0	0	0
FHA0000	Remediation of Environment	3	0	0	0	0	0	0
FHA0000	SAP ERP 6.0 Basics	3	0	0	0	0	0	0
FHA0000	Maintenance	0	4	0	0	0	0	0
FHA0001	Urban and regional planning	5	0	0	0	0	0	0
FHA0001	Traffic safety and psychology	5	0	0	0	0	0	0

FHA0001	Street and road planning	5	0	0	0	0	0	0
FHA0001	Quality Management	5	0	0	0	0	0	0
FHA0001	Process Management	0	5	0	0	0	0	0
FHA0001	Quality Management	5	0	0	0	0	0	0
FHA0001	Production planning	5	0	0	0	0	0	0
FHA0001	Purchasing	5	0	0	0	0	0	0
FHA0001	B2B -marketing and sales	5	0	0	0	0	0	0
FHA0001	Supply Chain Management	5	0	0	0	0	0	0
FHA0001	Inventory Management	5	0	0	0	0	0	0
FHA0001	Transportation	5	0	0	0	0	0	0
FHA0001	Service Business B2B	0	5	0	0	0	0	0
FHA0001	Organizing Service Business	5	0	0	0	0	0	0
FHA0001	Marketing and Selling Service Products	5	0	0	0	0	0	0
FHA0001	Process Management	0	5	0	0	0	0	0
FHA0001	Production planning	5	0	0	0	0	0	0
FHA0001	Purchasing	5	0	0	0	0	0	0
FHA0001	B2B –marketing and sales	5	0	0	0	0	0	0
FHA0001	Supply chain management	5	0	0	0	0	0	0
FHA0001	Inventory management	5	0	0	0	0	0	0
FHA0001	Transportation	5	0	0	0	0	0	0
FHA0001	Service Business B2B	0	5	0	0	0	0	0
FHA0001	Organizing Service Business	5	0	0	0	0	0	0
FHA0001	Marketing and selling Service products	5	0	0	0	0	0	0
FHA0001	Entrepreneurship - attitude and action	3	0	0	0	0	0	0
FHA0001	Basics of business operations	3	0	0	0	0	0	0
FHA0001	Entrepreneurship - attitude and action	3	0	0	0	0	0	0
FHA0001	Basics of business operations	3	0	0	0	0	0	0
FHA0001	Smart Building Control	5	0	0	0	0	0	0
FHA0001	Leadership	0	3	0	0	0	0	0
FHA0001	Sales and Marketing	0	3	0	0	0	0	0
FHA0001	House Building	15	0	0	0	0	0	0
FHA0001	Basics of Civil Engineering	15	0	0	0	0	0	0
FHA0004	House Building	15	0	0	0	0	0	0
FHA0004	Basics of Civil Engineering	15	0	0	0	0	0	0
FHA0004	House Building	15	0	0	0	0	0	0
FHA0004	Basics of Building Production	15	0	0	0	0	0	0
FHA0004	Management and finance	0	5	0	0	0	0	0
FHA0004	Management and finance	0	5	0	0	0	0	0
FHA0004	Software Development Project - Information Technology (FUAS Innovation School)	0	3	0	0	0	0	0
FLM0001	Chemistry	0	3	0	0	0	0	0

FLM0001	Energy Efficiency	0	3	0	0	0	0	0
FLM0001	Nonwoven Fabrics and Technical Textiles	0	3	0	0	0	0	0
FLM0001	Finnish supplementary studies	0	3	0	0	0	0	0
FHA0004	Development Project - Construction Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FLM0001	Remediation of polluted soils	5	0	0	0	0	0	0
FLM0001	Hazardous Materials	5	0	0	0	0	0	0
FHA0004	Software Development Project - Information Technology (FUAS Innovation School)	0	2	0	0	0	0	0
FHA0001	CAD and BIM	0	6	0	0	0	0	0
FHA0001	English for Engineers	2	0	0	0	0	0	0
FHA0001	Finnish	1	0	0	0	0	0	0
FHA0001	English for Engineers	1	0	0	0	0	0	0
FHA0001	Finnish	2	0	0	0	0	0	0
FHA0001	Basics of Environmental Engineering	3	0	0	0	0	0	0
FHA0004	Development Project - Mechanical Engineering (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0004	Traffic Planning Project - Traffic (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0004	Software Development Project - Information Technology (FUAS Innovation School)	12	0	0	0	0	0	0
FHA0004	Project Management	3	0	0	0	0	0	0
FHA0004	Project Management	3	0	0	0	0	0	0
FLM0001	Water and Waste Water Treatment and Utilization	5	0	0	0	0	0	0
FLM0001	Environmental Chemistry	3	0	0	0	0	0	0
FLM0001	Academic Writing	3	0	0	0	0	0	0
FLM0001	Digitalisation of the Future	3	0	0	0	0	0	0
FLM0001	Networks, Data Security and Cloud Services	3	0	0	0	0	0	0
FLM0001	Digital Tools	4	0	0	0	0	0	0
FHA0004	Finnish Nutrition	5	0	0	0	0	0	0
FHA0004	Basics of Nutrition	5	0	0	0	0	0	0
FHA0004	Food Security and Food Safety	5	0	0	0	0	0	0
FLM0001	Swedish Language Written SkillsSwedish Language Written Skills	1,5	0	0	0	0	0	0
FLM0001	Swedish Language Oral SkillsSwedish Language Oral Skills	1,5	0	0	0	0	0	0
FLM0001	Professional Communication (Finnish)Professional Communication (Finnish)	3	0	0	0	0	0	0
FLM0001	Processing and Productizing of Wood, Lahti UAS	5	0	0	0	0	0	0
FHA0003	Software Development Project - Information Technology (FUAS Innovation School)	0	3	0	0	0	0	0
FHA0003	Software Development Project - Information Technology (FUAS Innovation School)	2	0	0	0	0	0	0
FHA0003	Development Project - Mechanical Engineering (FUAS Innovation School)	1	0	0	0	0	0	0

FHA0003	Development Project - Mechanical Engineering (FUAS Innovation School)	0	3	0	0	0	0	0
		2824	1943,5	0	0	0	0	0

FLM0000006 Differential and integral calculus I, 3 cr

FLM0000007 Purchasing and retailing in the clothing industry, 3 cr

FLM0000008 Special project in media technology, 5 cr

FLM0000009 Special project in information technology, 5 cr

FLM0000010 Climate and energy targets in Europe, 4 cr

FLM0000011 Environmental legislation, 5 cr

FHA0000015 Project Managemet, 3 cr

The student is able to:

Tavoite:

Opiskelija oppii projektin suunnittelun ja läpiviennin eri vaiheet ja niiden merkityksen. Opiskelija ymmärtää moniprojektien hallinnan ongelmallisuuden.

Opiskelija osaa laatia oman projektisuunnitelman, arvioida muiden laatimaa projektisuunnitelmaa ja tehdä parannusehdotuksia. Opiskelija saa valmiudet toimia erilaisissa projektitehtävissä.

FHA0000019 Design Project, 15 cr

The student is able to:

Työelämäprojekti on ulkopuolisille toimeksiantajille tehtävä tuotekehitysprojekti. Keskeistä projektityön läpiviennissä on monialainen tiimityö, jossa eri alan opiskelijat ratkovat yhdessä pienryhminä toimeksiantajien tuotekehitysprosesseihin liittyviä haasteita. Pedagogisena lähtökohtana on tutkiva oppiminen.

Opiskelija oppii ottamaan huomioon suunnittelutehtäviin liittyviä ulkopuolisia rajoituksia ja vaatimuksia. Hän tuntee tuotesuunnittelutyön metodologiaa ja ymmärtää suunnitteluprosessin läpiviennin sen eri välivaiheineen.

Opintojen aikana opiskelija tutustuu projektimuotoiseen toimintaan, sen suunnitelmalliseen organisointiin ja johtamiseen. Hän osaa tehdä projektisuunnitelman, keskeisiä teemoja ovat projektisuunnittelu, työroolit projektissa, projektin ositus, aikataulutus ja resurssointi sekä projektin läpivienti.

FHA0000033 Project Technology, 3 cr

The student is able to:

Students are familiar with working in projects and planning, organizing and managing them. Students can make project plan as well as plan roles, partition, scheduling, resourcing and evaluation of a project and apply project technology in them.

Students know some tools of the application areas of project management. Students can use one widely used commercial project management tool.

FHA0000034 Productivity, 3 cr

The student is able to:

Students know the role and meaning of the productivity in projects. Students can define productivity and plan key performance indicators and improvement actions of it as well as make productivity measurements. Students apply

theory into practice by playing a productivity board game.

FHA0000035 Product Development, 3 cr

The student is able to:

Students know the importance of product development in projects. Students are able to combine the project management with the Product Development process, Sustainable Development, Designing for Productivity, Modularisation, Specialization, Conceptualization and Mass Customisation.

Students know how to utilize most common product development tools.

FHA0000036 Quality Control, 3 cr

The student is able to:

Students know the nature and role of quality and Quality Control. They are able to include the Quality Control in the project management. They are able to handle principles of quality standards and models as well as quality cost calculation. Students know how to manage existing quality control systems and are able to participate in developing them.

Students can use some quality development and quality control methods and tools.

FHA0000037 Software Development Project, 15 cr

The student is able to:

Opintojaksolla perehdytään ohjelmistotuotantoon käytännössä määrittelemällä, suunnittelemalla ja toteuttamalla asiakkaan toimeksiannon mukainen ohjelmistotuote. Asiakkaana voi olla ulkopuolinen taho, yritys, toinen opiskelija/ opiskelijaryhmä tai oppilaitoksen sisäinen intressiryhmä (esim. toinen koulutusohjelma). Opintojakson aikana opiskelija oppii käytännössä ohjelmistokehitysprosessissa tarvittavia taitoja kuten projektityöskentelyä, suunnittelua, dokumentointia, tiimityötä, kuvausmenetelmiä, vaihejakomalleja sekä ohjelmistotuotteen kehittämisessä tarvittavia tekniikoita, ohjelmointikieliä, sovelluskehittämiä yms. Opintojakson pedagogisena lähtökohtana on ongelmalähtöinen, tutkiva oppiminen.

FHA0000038 Traffic Planning Project, 15 cr

The student is able to:

tulossa...

FHA0000045 Project of Business and Technology, 3 cr

The student is able to:

Students have knowledge of basics of the project management. Students are familiarized themselves with some parts of business operations and special problems of them. The project work emphasizes how the business operations are linked in to the technical knowledge.

Students can make a project plan, documentation and report by using a project management application tool.

FHA0000083 Organisational Communication, 3 cr

The student is able to:

Opiskelija osaa

viestiä tavoitteellisesti opiskelijana ja työyhteisön jäsenenä sekä kasvokkain että verkossa tunnistaa vaikutuksensa ja vastuunsa työyhteisön viestintä- ja vuorovaikutustilanteissa tuottaa viestintä- ja vuorovaikutustilanteen tavoitteen ja normien mukaisia puhuttuja ja kirjoitettuja tekstejä

arvioida omaa viestintätaitoaan ja asettaa itselleen kehittymistavoitteita.

FHA0000085 Algebra, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa lausekkeiden käsittelyn
osaa ratkaista ja muodostaa yhtälöitä ja epäyhtälöitä
osaa ratkaista ja muodostaa yhtälöryhmiä
hallitsee trigonometristen funktioiden ja niiden käänteisfunktioiden yleiset määritelmät sovelluksineen
osaa soveltaa eksponentti- ja logaritmifunktioita.

FHA0000086 Geometry and Linear Algebra, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa taso- ja avaruusgeometrian perusmenetelmät
osaa vektorilaskennan peruskäsitteet tasossa ja kolmiulotteisessa avaruudessa ja soveltaa vektorilaskentaa teknisiin ongelmiin
osaa analyyttisen geometrian peruskäsitteet ja soveltamisen käytännön ongelmiin
osaa kompleksilukujen ja kompleksimuuttujan funktioiden peruskäsitteet ja -sovellukset
osaa matriisien peruslaskutoimitukset ja soveltaa matriiseja ongelmanratkaisuun.

FHA0000091 Fundamentals of Automation Engineering, 4 cr

The student is able to:

Students know the structure of automation systems. They can describe common control systems using standard diagrams. Students know the essential technology of automation systems, automation devices and their functions. This course is closely integrated to the course Practical Automation Works.

FHA0000092 Electrical Engineering, 3 cr

The student is able to:

Students know simple AC and DC circuits as well as the basic concepts behind them, components, quantities and units. They know how to apply mathematical methods in the analysis and synthesis of circuits in order to achieve a desired outcome. Students know how to deal with direct current circuit transients in the time domain. Students know alternating circuits and pointer calculus with them. They can do descriptions of circuit functions in time and frequency domain. Students can calculate step response using numerical methods.

FHA0000094 Specialist Communication, 3 cr

The student is able to:

Opiskelija - osaa tehostaa ja hyödyntää tiedonhallintataitojaan- osaa hahmottaa esimiestyöhön kuuluvat viestintätaitovaatimukset- osaa valmistautua asiantuntijuutta vaativiin viestintätilanteisiin- osaa toimia päätöksentekotilanteissa asiantuntijan tavoin

FHA0000096 Instrumentation, 3 cr

FHA0000098 Application Development, 4 cr

FHA0000100 Field Design, 4 cr

FHA0000103 Electrical Machine Automation Devices, 4 cr

FHA0000084 Working English, 3 cr

The student is able to:

Opiskelija osaa

kommunikoida suullisesti tyypillisimmissä alakohtaisissa työelämään ja opiskeluun liittyvissä vuorovaikutustilanteissa
tuottaa tavallisimpia alakohtaisia työelämässä ja opiskelussa tarvittavia tekstejä
käyttää keskeisintä omaan alaan ja opiskeluun liittyvää sanastoa
ottaa huomioon oman alansa kansainvälistymiskehityksen vaikutukset ja mahdollisuudet
Tavoitteena on, että opiskelija saavuttaa Eurooppalaisen viitekehyksen B2-taitotasoa vastaavan osaamisen.

FHA0000106 Professional Swedish, 3 cr

The student is able to:

Opiskelija osaa

viestiä tavallisissa alakohtaisissa vuorovaikutustilanteissa sekä suullisesti että kirjallisesti
käyttää keskeistä alakohtaista sanastoa
kertoa koulutuksestaan ja työtehtävistään esim. työnhakutilanteissa
esitellä yritysten ja organisaatioiden toimintaa, tuotteita ja palveluita suullisesti ja kirjallisesti sekä keskustella näistä aiheista.
Tavoitteena on, että opiskelija saavuttaa sellaisen ruotsin kielen taidon, joka julkisyhteisöjen henkilöstöltä vaadittavasta kielitaidosta annetun lain (424/2003) mukaan vaaditaan korkeakoulututkintoa edellyttävään virkaan kaksikielisellä virka-alueella. Tavoitteena on, että opiskelija saavuttaa Eurooppalaisen viitekehyksen B1-taitotasoa vastaavan osaamisen.

FHA0000089 Physics 1, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa

perusfysiikassa käytettävät suureet ja niiden yksiköt
laskea kinematiikan perustehtävät
soveltaa Newtonin lakeja
työn, tehon ja energian käsitteet sekä osaa soveltaa työ-energia-periaatetta
käyttää impulssilakia ja liikemäärän säilymisen lakia
laskea keskeiskiihtyvyyden ja keskeisvoiman ympyräliikkeessä
gravitaatiovuorovaikutuksen käsitteen
määrittää kappaleen tasapainoehdot ja laskea painopisteen
huomioida kappaleen kimmoiset ominaisuudet
nesteidien ja kaasujen mekaniikan perusteet.

FHA0000107 Professional IT Tools, 6 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee koulutusalan yleisimmät ammatilliset sovellukset. Opiskelijalla on perustiedot nykyaikaisesta tiedontalioinnista ja käyttämisestä. Opiskelija osaa ammattialansa yleisten sovellusten käytön opiskelu- ja työtehtävien yhteydessä. Ammatillisten sovellusten käyttöön perehtyminen tapahtuu koulutusohjelmakohtaisesti määritettyjen keskeisten sovellusten avulla.

FHA0000108 Programmable Logic Controllers, 3 cr

The student is able to:

Students know the operational principles of programmable logics as well as how to program them. They can do modular programming and employ small-scale controlling applications on an automation device. Students know the system control on automation devices and application programming environment.

FHA0000109 Measurement Technology, 5 cr

The student is able to:

Students know the nature of the signal to be measured. They can choose the proper measurement technique and use it in the measurement. Students know measurement uncertainty evaluation and can put this into practice. Students know the significance of calibration. Students know both in theory and practice the basic industrial measuring methods of electrical and process variables as well as the excitation of measuring transmitters in production environment. Students can do good technical documentation reports.

FHA0000093 Electrical Power Engineering, 6 cr

The student is able to:

Having completed the course, students:

know the structure of an power distribution network and main generation systems
know potential disturbances in the network and the correct methods for avoiding these
know the basic concepts of electrical safety and can follow safety procedures in electrical work
know grounding methods in electrical power networks
can calculate symmetric three-phase system design calculations
know magnetism basic concepts and can apply these to electric machines
can choose the correct electric drive and use of electricity for a specific purpose.

FHA0000110 Electronics, 5 cr

The student is able to:

Students know the basic components of analogue electronics, functions of typical circuit structures and measurements of discrete components used in them. They can perform simple couplings. Students can look for information in data books of electronics manufacturers and can use them for solving problems. Students know the most common logic families and their properties. They know how to analyse the functions of devices implemented through logic circuits using technical documentation and data books. Students know logic functions and are able to implement these using basic gate logic circuits. Students know how to perform standard couplings, know the graphical symbols used in electronics, understand the significance of documents and can interpret these.

FHA0000095 Professional English, 3 cr

The student is able to:

Opiskelija osaa toimia vaativissakin oman alansa viestintätilanteissa englannin kielellä sekä suullisesti että kirjallisesti. Hän tuntee oman alansa terminologiaa ja pystyy hyödyntämään kielitaitoaan asiantuntijatehtävissä. Tavoitetasona on eurooppalaisen viitekehyksen tasoa B2 vastaava osaaminen.

FHA0000113 Engineering Physics, 3 cr

FHA0000111 Mathematics 2a, 3 cr

The student is able to:

Tavoitteet: Opintojakson tavoitteena on syventää matemaattisia kommunikointitaitoja etenkin tekniikan ongelmissa

sekä kehittää insinööriopinnoissa, mahdollisissa jatko-opinnoissa sekä insinöörin työssä tarvittavia matemaattisia valmiuksia. Opintojaksolla perehdytään tavallisimpien tekniikan ongelmissa esiintyvien funktioiden differentiaali- ja integraalilaskentaan.

Esitiedot: Matematiikka 1a ja Matematiikka 1b

Yhteydet muihin opintojaksoihin: Matematiikka 2b

Asiasanat: Tekniikka ja liikenne, yhteiset opinnot, matematiikka

FHA0000114 Programming, 5 cr

FHA0000119 Working English, 3 cr

The student is able to:

The student should achieve an oral and written level of English with which he/she can communicate in a specific working environment of the student's chosen field. The minimum aim is the European language proficiency level B2.

FHA0000120 Daily Finnish, 4 cr

The student is able to:

The student possesses an elementary proficiency level of Finnish that allows him/her to passably cope in the most basic daily situations. S/he also has basic knowledge of Finnish culture and the skills to get by in Finnish society. The target level for language proficiency is the level A1.2 of the Common European Framework of Reference for language learning.

FHA0000123 Learning Skills, 3 cr

The student is able to:

The course aims at supporting the students in their studies at a university of applied sciences and in becoming familiar with their professional field.

The aim of the course is that the students

are able to study in HAMK's learning environments and use the opportunities they offer,
know the structure and content of the curriculum in their own degree programme,
are familiar with their own professional field and its career opportunities,
know the personal study plan (PSP) process,
are able to complete their first PSP,
master the performance appraisal process as part of professional development and standard practice at the workplace,
are able to prepare themselves for a performance appraisal,
seek necessary guidance and counselling from the correct persons,
improve their learning skills and study methods,
master the principles of interpersonal and teamwork skills,
become a part of the student community, and
are responsible for their own studies and professional growth.

FHA0000124 Computer Skills, 3 cr

The student is able to:

The students learn to use computers, office solutions and information networks in their studies and in their study and work environment.

The students master modern communication methods and technology, which they use to communicate, and retrieve and disseminate information.

The students master collaborative information tools and are capable of producing collaborative knowledge on the web.

The students are responsible users of computers and information networks and are capable of managing

information security in different environments (study, work, home, leisure time).

FHA0000122 Algebra, 3 cr

The student is able to:

Having completed the course, students:

- know how to process algebraic expressions
- can solve and formulate equations and inequalities
- can solve and formulate systems of equations
- are familiar with the definitions and applications of trigonometric functions and their inverse functions
- know how to apply exponential and logarithmic functions.

FHA0000126 Physics 1, 3 cr

The student is able to:

Having completed the course, students:

- are familiar with the variables used in basic physics, and their units
- can calculate basic kinematic equations
- can apply Newton's laws
- understand the concepts of work, power and energy and can apply the principles of work-energy
- can apply the law of impulse and the law of inertia
- can calculate normal acceleration and central force in circular motion
- understand the concept of gravitational interaction
- can determine the balance equations and centre of gravity of an object
- can observe the elastic properties of an object
- know the principles of liquid and gas mechanics.

FHA0000130 Electrical Engineering, 3 cr

The student is able to:

Students know simple AC and DC circuits as well as the basic concepts behind them, components, quantities and units. They know how to apply mathematical methods in the analysis and synthesis of circuits in order to achieve a desired outcome. Students know how to deal with direct current circuit transients in the time domain. Students know alternating circuits and pointer calculus with them. They can do descriptions of circuit functions in time and frequency domain. Students can calculate step response using numerical methods.

FHA0000128 Fundamentals of Automation Engineering, 4 cr

The student is able to:

Students know the structure of automation systems. They can describe common control systems using standard diagrams. Students know the essential technology of automation systems, automation devices and their functions. This course is closely integrated to the course Practical Automation Works.

FHA0000133 Differential and Integral Calculus, 3 cr

The student is able to:

Having completed the course, students:

- can describe the basic concepts of a function
- understand what a limit value is and how to calculate basic limits
- can explain what is meant by a continuous function
- understand what is meant by a derivative and what is its significance in geometry
- can derive elementary functions

can use differential calculus in applications
understand the concept of the integral function and can integrate elementary functions
understand the definition of the definite integral, can calculate definite integrals and can describe their main applications

FHA0000135 Working Finnish, 6 cr

The student is able to:

Learning outcomes: The student will achieve a first stage of basic proficiency level of Finnish that allows him/her to adequately manage in daily situations. S/he has knowledge of Finnish working life and culture as well as the basic skills to operate in his/her own field of work. The target language level for language proficiency is A2.1 of the Common European Framework of Reference for language learning.

FHA0000136 Physics 2, 3 cr

The student is able to:

Having completed the course, students:

understand temperature and know the different temperature scales
know about heat expansion in liquids and solids
understand thermal energy and thermal capacity and can handle heat transfer mechanisms
know about changes of state and calorimetric calculations
know the state values of gases and can calculate the state and changes of state of gases using state equations
know the main rules of thermodynamics and are familiar with the single cycle process
understand electrical charge and the interaction between charges
know how electrical and magnetic fields are created and how charges behave in electromagnetic fields
can apply Ohm's law
can solve simple direct current circuits
know about the magnetic properties of matter
know about electromagnetic induction.

FHA0000138 Programming, 4 cr

The student is able to:

Students know the basic principles of programming, the basics of a high level programming language and the phases in software generation. Students know the main principles of procedural and object-oriented programming.

FHA0000141 Measurement Technology, 5 cr

The student is able to:

Students know the nature of the signal to be measured. They can choose the proper measurement technique and use it in the measurement. Students know measurement uncertainty evaluation and can put this into practice. Students know the significance of calibration. Students know both in theory and practice the basic industrial measuring methods of electrical and process variables as well as the excitation of measuring transmitters in production environment. Students can do good technical documentation reports.

FHA0000143 Electronics Applications in Automation Engineering, 3 cr

The student is able to:

Students know the components and simple switching diagrams in electronics. They can design a small electronic device. Students know how to evaluate the use of microcontrollers for embedded automation solutions. They know the structure of microcontrollers as well as their hardware functions.

FHA0000145 Applied Mathematics, 3 cr

The student is able to:

Learning outcomes: Mathematics in connection with automation engineering is dealt with during the course. Students learn the methods used when analysing linear space-time continuum and discrete time systems. Students get to know spectrum analysis.

FHA0000147 Fieldbus Technology, 3 cr**The student is able to:**

Learning outcomes: Students become familiar with process automation fieldbuses and know the configuration methods of fieldbuses in automation systems. The course covers error diagnostics in connection with buses. Installation issues as well as measurement of field segments are emphasized during the course.

FHA0000148 Distributed Control Systems, 4 cr**The student is able to:**

Learning outcomes: Students know the basics of systems application engineering and can program small-scale applications into the system. They are familiar with planning tools in distributed control system and know the methods of configuration.

FHA0000149 Field Design, 4 cr**The student is able to:**

Learning outcomes: Students get to know the basics of field instrumentation as well as typical circuit structures. The course provides the students with competences to produce process automation field design using the CAD system as a standard. Students are familiar with the documentation needed for field design.

FHA0000146 Control Engineering, 4 cr**The student is able to:**

Learning outcomes: Students get to know the unitary processes within process technology and understand the operation of closed control loops on both a time domain and Laplace basis. They are familiar with the tuning of a PID controller. Students become familiar with the basics of digital signal processing such as digital filtering, linearization of signals and the PID algorithm.

FHA0000152 Pneumatics and Hydraulics, 3 cr**The student is able to:**

Learning outcomes: Students know the terminology of pneumatics and hydraulics. Students are able to estimate the possibilities to utilize pneumatic and hydraulic actuators and control systems. Students can design small pneumatic and hydraulic control systems.

FHA0000137 Technical Documentation, 3 cr**The student is able to:**

Having completed the course, students have basic knowledge of documentation related to the design, manufacture and use of a technical product. They are familiar with the basic terminology of the field, can create simple technical documents and know some of the computer software available for the field.

FHA0000150 Human-Machine Interface, 4 cr**The student is able to:**

Learning outcomes: Students get to know control programs during the course. They learn how to configure these

and how to execute them in different operational environments. Students learn to design an extensive control program application, which is tested in a laboratory setting.

FHA0000156 Industrial Processes, 4 cr

The student is able to:

Learning outcomes: Students get to know a process and energy technology processes such as: flow, heat transfer, incineration and steam, as well as the operating principles of the devices used in these processes. Students become familiar with the properties of the most common valves and pumps.

FHA0000155 Maintenance Economics, 4 cr

The student is able to:

Learning outcomes: Students get an overall view to the economics of industrial maintenance. They are able to estimate the meaning of economical matters in optimizing maintenance work. Students are able to calculate the profitability of machine investments.

FHA0000154 Industrial Maintenance, 4 cr

The student is able to:

Learning outcomes: Students get an overall view of the area of industrial maintenance. Students know the terminology of industrial maintenance, typical ways to organize the maintenance, the basic maintenance operations and the method to choose them. They can estimate the reliability of production machines based on statistics.

FHA0000157 Measuring and Automation Programs, 4 cr

The student is able to:

Learning outcomes: Students get to know targets where Measuring and Automation Programs are implemented into automation engineering. They know how to implement program applications for these in a laboratory setting.

FHA0000160 Software Technology in Automation, 4 cr

The student is able to:

Learning outcomes: Students learn the basic theory and methodology of system design. They can apply these methods using modern miniature automation devices and software. Students know how to devise a system description and how to apply a structural method in design.

FHA0000161 Safety in Automation, 3 cr

The student is able to:

Learning outcomes: Students know the meaning of safety in an industrial process and they understand the importance of automation engineering in ATEX directive implementation inside process field. Students know technical solutions to fulfil directive demands. Students can do safety planning as part of automation design.

FHA0000008 Entrepreneurship, 3 cr

The student is able to:

Opintojakson tavoitteena on perehdyttää opiskelija alan yrittäjyyteen ja yrittäjämäiseen toimintaan. Opiskelija näkee yrittäjyyden yhtenä mahdollisuutena omalla ammattialallaan sekä oppii kehittämään itseään ammattialansa sisäisenä yrittäjänä. Opiskelija ymmärtää kannattavan ja asiakaslähtöisen toiminnan periaatteita. Opiskelija perehtyy yritystoiminnan perusedellytyksiin sekä yrityksen toimintaan osana kansantaloutta. Opiskelija perehtyy Starttihautomon toimintaan ja mahdolliseen yrittäjyyspolkuun osana henkilökohtaista opintosuunnitelmaa. Asiakokonaisuudet: Yrittäjyyden perinteet ja yrittäjyyden kehittyminen. Yrittäjyyden perusteet &

FHA0000140 Fundamentals of Data Communications, 3 cr

The student is able to:

Having completed the course, students know:

the basis of data communications system
standardization significance in telecommunications
main principles in information transmission
Local Area Network structures used as backbone in automation system.

FHA0000191 Marketing, 3 cr

The student is able to:

Tavoitteet: Opiskelija perehtyy oman toimialansa markkinoiden käyttäytymiseen, segmentointiin ja kilpailuun. Hän perehtyy yrityksen kilpailukeinoihin ja oppii arvioimaan oman alansa yritysten markkinointiratkaisuja. Opiskelija osaa hankkia markkinoinnin kannalta sopivia perustietoja. Hän ymmärtää viestinnän merkityksen markkinoinnin toteutuksessa sekä pystyy selviytymään oman alansa tavanomaisista myyntineuvottelu- ja kampanjansuunnittelutilanteista. Tavoitteena on rohkaista opiskelijaa yrittäjyyteen.

Asiasanat: tekniikka, konetekniikka, tuotantotalous, markkinointi, myynti, mainonta

FHA0000180 Numerical Analysis, 3 cr

The student is able to:

The student will be able to apply the numerical methods that are required in the modern analysis of mechanical structures. The course will cover the general features of numerical calculation, methods in the calculation of linear and nonlinear systems of equations, the approximation of functions, numerical integration, the numerical calculation of differential equations.

Prerequisites: Mathematics 2a and 2b

Keywords: Mathematics, numerical analysis

FHA0000181 Finite Element Methods for Mechanical Engineers, 5 cr

The student is able to:

The student will become familiar with the basics of finite element methods (FEM) and will be able to apply these methods using commercial programs in static and dynamic analysis. The course will cover a general overview of FEM and its significance in modern product development, the operational equations of linear FE analysis and their formation, static and dynamic structural analysis, exercises with commercial software and links to CAD programs.

Prerequisites: Mechanics of materials. Mechanics

Keywords: Technology, mechanical engineering, FEM, mechanics of materials

FHA0000193 Engineering Physics, 3 cr

The student is able to:

Tavoitteet: Keskeisenä tavoitteena on syventää koneinsinööreille olennaista fysiikan osa-aluetta. Kurssilla keskitytään mekaniikan alueella pyörimisliikkeeseen ja värähdysliikkeeseen. Aaltoliikeopista käydään läpi mekaaninen/akustinen aalto sekä sähkömagneettinen aalto. Kurssin suoritettuaan opiskelijalla on selkeä käsitys pyörimisen ja värähtelyn dynamiikasta ja lisäksi hän hallitsee mekaanisen aallon, ääniopin ja optiikan perusasiat sekä ymmärtää näiden asioiden keskeisen merkityksen ammattiaineiden kannalta.

Asiasanat: tekniikka, luonnontieteet, fysiikka, dynamiikka, värähtelyt

FHA0000192 Computer Based Mathematics, 3 cr

The student is able to:

Tavoitteet: Kurssin suoritettuaan opiskelija osaa eräitä numeerisen menettelyn algoritmeja ja osaa suorittaa niiden vaatimat laskutoimitukset ohjelmoitavan laskimen tai/ja tietokoneohjelman avulla sekä hallitsee kohtuullisessa määrin jonkun modernin matematiikkaohjelman käytön ja osaa käyttää sen mahdollisuuksia hyväkseen ratkaisujen hakemiseen myös sellaisissa tehtävissä, jotka eivät muilla perinteisillä keinoilla onnistu

Esitiedot: Matematiikka 1a ja b, Matematiikka 2 a ja b

Asiasanat: tekniikka, matematiikka, tietotekniikka

FHA0000188 Internet and Telecommunication, 3 cr

The student is able to:

Having completed this course, the student knows about the structures of data networks and their operating methods, so that he/she can utilise them in planning data transfer in his/her own field. The student knows about general network security and the risks involved in network data transfer.

FHA0000196 Workshop Measurement and Tolerances, 6 cr

The student is able to:

The student will gain an understanding of the importance of workshop measurements. The student will become familiar with the most common workshop measuring tools and methods, both theoretically and practically. The student will also get deep understanding of both dimensional and geometrical tolerances.

Keywords: technology, mechanical engineering, workshop measurements, tolerances

FHA0000198 Industrial Economics, 3 cr

The student is able to:

During the course, the student learns about business and accountancy in an industrial environment. The course focuses on production from an economic perspective, paying close attention to the achievement of profitability.

FHA0000194 Modeling 1, 3 cr

The student is able to:

The student will understand the basics of feature based, parametric 3D modeling. He or she can construct design parts using basic features like extrusion, revolve, round etc. Also the copy commands copy and pattern will be familiar. Keywords: technology, mechanical engineering, technical documents, 3D modeling

FHA0000087 Differential and Integral Calculus, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa kuvailla funktion peruskäsitteitä

ymmärtää, mikä on raja-arvo ja osaa raja-arvon laskemisen alkeita

osaa kuvailla mitä tarkoittaa, että funktio on jatkuva

ymmärtää, mitä tarkoittaa derivaatta ja mikä on sen geometrinen merkitys

osaa derivoida alkeisfunktioita
osaa käyttää differentiaalilaskentaa sovelluksissa
ymmärtää integraalifunktion käsitteen ja osaa integroida alkeisfunktioita
ymmärtää määrätyn integraalin määritelmän, osaa laskea määrätyn integraalin arvon ja kuvailla keskeisiä määrätyn integraalin sovelluksia.

FHA0000117 Application Programming, 4 cr

FHA0000144 Maintenance, 3 cr

The student is able to:

Students know the fundamentals of industrial maintenance and can do a small maintenance application for industrial production line. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000204 Traffic and Transport Economy, 3 cr

The student is able to:

Having completed this course, the student knows the basic concepts of the transport economy, and how they are linked to the planning, impact assessment and decision-making of the transport system. He/she understands the common principles of highway project assessment, and the special characteristics of project assessment for different forms of traffic. The student possesses the skills to assess the impact of time, the environment and safety and to assess profitability calculations and the impact of conventional traffic projects from given source data.

The student also knows how state road maintenance is programmed, budgeted and assessed. He/she also has an overall picture of the preparation of traffic demand forecasts, indicators of the objectives of a traffic system and their features, and the principles and practical points of reference of traffic pricing and other regulation.

FHA0000088 Computer skills, 3 cr

The student is able to:

Opiskelija osaa käyttää tietokoneita ja toimistosovelluksia sekä tietoverkkoja opiskelun välineenä ja opiskelu- sekä työympäristönä.

Opiskelija osaa käyttää nykyaikaisia viestintämenetelmiä ja -tekniikkaa vuorovaikutustilanteissa sekä tiedonhankinnassa ja -välittämisessä.

Opiskelija osaa käyttää yhteisöllisiä työvälineitä sekä pystyy rakentamaan yhteisöllistä tietämystä verkossa.

Opiskelija osaa toimia vastuullisena tietokoneiden ja -verkkojen käyttäjänä sekä toimii tietoturvallisesti eri ympäristöissä (opiskelu, työ, koti ja vapaa-aika).

FHA0000090 Physics 2, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

ymmärtää lämpötilan ja tuntee eri lämpötila-asteikot
hallitsee nesteiden ja kiinteiden aineiden lämpölaajenemisen
ymmärtää lämpöenergian ja lämpökapasiteetin sekä hallitsee lämmönsiirtomekanismit
osaa olomuodon muutokset ja kalorimetriset laskut
osaa kaasujen tilasuureet ja pystyy laskemaan kaasun tilan ja tilanmuutoksen tilayhtälöiden avulla
osaa termodynamiikan pääsäännöt ja tuntee yksinkertaisen kiertoprosessin
tietää sähkövarauksen ja sähkövarausten välisen vuorovaikutuksen
tietää kuinka sähkö- ja magneettikenttä syntyvät ja miten varaus käyttäytyy sähkömagneettisessa kentässä
osaa soveltaa Ohmin lakia
osaa ratkaista yksinkertaisia tasavirtapiirejä
osaa aineen magneettiset ominaisuudet

osaa sähkömagneettisen induktion.

FHA0000097 Fieldbuses, 3 cr

FHA0000099 Programming, 5 cr

FHA0000101 Control Room Applications, 4 cr

FHA0000102 Miniature Automation Desing, 4 cr

FHA0000104 Learning Skills, 3 cr

The student is able to:

Opintojakson tavoitteena on tukea opiskelijan ammattikorkeakoulumaista opiskelua ja perehtymistä ammattialaan. Opintojakson tavoitteena on, että opiskelija osaa toimia HAMKin oppimisympäristöissä ja käyttää niiden tarjoamia mahdollisuuksia
hahmottaa koulutusohjelmansa opetussuunnitelman rakenteen ja sisällön
tuntee ammattialansa ja sen tarjoamat työmahdollisuudet
hahmottaa henkilökohtaisen opintosuunnittelun (HOPS) prosessin
osaa tehdä ensimmäisen HOPSin
hallitsee kehityskeskusteluprosessin osana ammatillista kehittymistä ja työelämän toimintatapoja
osaa valmistautua kehityskeskusteluihin
hakee opintoihin liittyen ohjausta tarpeen mukaan oikeilta henkilöiltä
kehittää oppimisvalmiuksiaan ja opiskelumenetelmiään
hallitsee vuorovaikutus- ja ryhmätyötaitojen periaatteet
ryhmytyy opiskeluyhteisöönsä
kantaa vastuuta omista opinnoistaan ja ammatillisesta kasvustaan

FHA0000105 Technical Documentation, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelijalla on perustiedot teknisen tuotteen suunnitteluun, valmistukseen ja käyttöön liittyvistä dokumenteista. Opiskelija tuntee alan perusterminologian, osaa laatia yksinkertaisia teknisiä dokumentteja sekä tuntee alan tietokoneavusteisia ohjelmia.

FHA0000112 Mathematics 2b, 3 cr

The student is able to:

Tavoitteet: Kurssin tavoitteena on syventää matemaattisia kommunikointitaitoja etenkin tekniikan ongelmissa sekä kehittää insinööriopinnoissa, mahdollisissa jatko-opinnoissa sekä insinöörin työssä tarvittavia matemaattisia valmiuksia. Opintojaksolla perehdytään differentiaaliyhtälöihin, tilastomatematiikkaan, usean muuttujan funktioihin sekä niiden soveltamiseen teknisiin ongelmiin.

Esitiedot: Matematiikka 1a, Matematiikka 1b ja Matematiikka 2a

Yhteydet muihin opintojaksoihin:

Asiasanat: Tekniikka ja liikenne, yhteiset opinnot, matematiikka

FHA0000115 Instrumentation, 3 cr

FHA0000116 Electronics Applications in Automation, 3 cr

FHA0000118 Electrical Drives, 3 cr

FHA0000121 Studying Finnish, 5 cr

The student is able to:

The student operates at a functional elementary proficiency level of Finnish and s/he can use the language that has been learned in simple oral and written communication situations. Also, the student is aware of the differences between spoken and written Finnish. The student is able to tentatively operate in Finnish society, particularly in situations related to his/her studies. The target language level for language proficiency is A1.3 of the Common European Framework of Reference for language learning.

FHA0000125 Geometry and Linear Algebra, 3 cr

The student is able to:

Having completed the course, students:

- know the basic methods of plane and space geometry
- know the basic concepts of vector calculus on a plane and in 3D, and can apply them to solve technical problems
- know the basic concepts of analytical geometry and how to apply them to practical problems
- know the basic concepts and applications of complex numbers and complex variables
- know the basic matrix calculations and can apply matrices to problem-solving.

FHA0000127 Professional IT Tools, 6 cr

The student is able to:

Having completed the course, students are familiar with the most common professional applications in the field. They have basic knowledge of contemporary data storage and processing. They can use the common applications in their field for their study and work tasks. Familiarisation with professional applications is field-specific, determined for each degree programme.

FHA0000129 Practical Automation Works, 5 cr

The student is able to:

Students can design and implement a small-scale relay and pneumatic control system, as well as implement logic controller into an industrial setting. Students can measure basic parameters in automation data communications environment. Students can write good technical reports.

FHA0000131 Electronics, 5 cr

The student is able to:

Students know the basic components of analogue electronics, functions of typical circuit structures and measurements of discrete components used in them. They can perform simple couplings. Students can look for information in data books of electronics manufacturers and can use them for solving problems. Students know the most common logic families and their properties. They know how to analyse the functions of devices implemented through logic circuits using technical documentation and data books. Students know logic functions and are able to implement these using basic gate logic circuits. Students know how to perform standard couplings, know the graphical symbols used in electronics, understand the significance of documents and can interpret these.

FHA0000132 Professional Mathematical Methods, 3 cr

The student is able to:

Having completed the course, students:

can describe the basic concepts of multivariable functions and how to apply them to technical problems
can define differential equations and can use elementary solving methods
can describe the main applications of differential equations
know and understand the main mathematical methods used in their own field and know how to apply them to solving various problems.

FHA0000134 Entrepreneurial activities, 3 cr

The student is able to:

Objectives of the study course is to recognize entrepreneurial process and entrepreneurial activities through which student is able to recognize business opportunities and is able to develop ideas into action. During the course student will

comprehend entrepreneurial process and importance of entrepreneurship to economy
comprehend entrepreneurial activities and core skills like problem solving, decision making, risk taking, interaction with others, acquisition and exploitation of information, setting objectives and conducting own work
comprehend distinction between entrepreneurship and intrapreneurship
comprehend entrepreneurial business planning

FHA0000139 Programmable Logic Controllers, 3 cr

The student is able to:

Students know the operational principles of programmable logics as well as how to program them. They can do modular programming and employ small-scale controlling applications on an automation device. Students know the system control on automation devices and application programming environment.

FHA0000142 Instrumentation, 3 cr

The student is able to:

Upon completion of course students know the basic connection principles of field devices in process automation. They know industrial valves, their application methods, measuring transducers and transmitters, as well as implementing these into the process. Students know how to use instrumentation cables for different target areas taking into account earthing and bonding principles. Students know the installation principles used in the hazardous areas.

FHA0000151 Robotics, 4 cr

The student is able to:

Learning outcomes: Students will know the terminology of robotics, the most used types of robots and the typical application possibilities. Students can use a robot and make application programs. Students are able to estimate the economical benefits of using robots. Students are able to lead the robot investing projects.

FHA0000153 Networks in Automation, 4 cr

The student is able to:

Learning outcomes: Students learn how modern, open automation systems are implemented and how they function, as well as how information technology is utilised in automation. Students know the information transfer methods of automation systems.

FHA0000158 Analysis Measurements, 4 cr

The student is able to:

Learning outcomes: Upon completion of the course students know the analytical measurements used in the wood

processing industry such as density, viscosity, humidity, pH and conductivity measurements as well as gas analysis methods.

FHA0000159 Machine Vision, 3 cr

The student is able to:

Learning outcomes: Students understand application possibilities of machine vision. They understand theoretical background of image processing. Students know methods to design machine vision in production automation. They can make a small machine vision application in the laboratory environment.

FHA0000162 Control Engineering, 4 cr

FHA0000163 Fundamentals of Data Communications, 3 cr

The student is able to:

Having completed the course, students know:

the basis of data communications system
importance of standardisation in telecommunications
main principles in information transmission
local area network structures used as backbone in automation system.

FHA0000178 Mechanical Engineering Measurements, 3 cr

The student is able to:

The student will become familiar with the general features of measurement systems and will be able to measure the variables of machines and other structures as well as analyze the measurement results. The course will cover the importance of measurement in product development and problem resolution, a general overview of measurement systems and the system components, the measurement of loads as well as of the stress and deformation in structures, and the measurement of oscillations. The focus will be on laboratory work with short lessons.

Prerequisites: Physics, Mechanics, Engineering Physics, Mechanics of Materials

Keywords: Technology, mechanical engineering, measurement

FHA0000179 Machine Dynamics, 4 cr

The student is able to:

The student will have a solid understanding of the basics of dynamics and oscillation mechanics. The student will understand the importance of machine dynamics in modern machine structures and will be able to apply his knowledge to dynamic-based measurement and oscillation problem resolution. The course will cover the practical significance of machine dynamics, the general dynamics of mechanical systems, oscillations of one degree of freedom, oscillations of several degrees of freedom, systems of continual mass and modern methods of analysis, damping of oscillations, the application of theory to the insulation of vibration and other practical problems.

Prerequisites: Mechanics of Materials, Mechanics, Engineering Physics

Keywords: Technology, mechanical engineering, dynamics, oscillation

FHA0000186 Mathematical Statistics, 3 cr

The student is able to:

Having completed this course, the student knows the basics of statistical mathematics and can apply them to the needs of the transport sector. Objects of application for mathematical statistics can be found in the needs of

transport analysis, research and surveys, as well as in business administration evaluation and marketing.

FHA0000187 Traffic Control Systems, 5 cr

FHA0000189 3D Techniques and Visualization, 3 cr

The student is able to:

Having completed this course, the student has the skills to create visualisations related to traffic planning using software suitable for the purpose. Such software includes model programmes, mathematical programmes, visualisation programmes and office automation programmes.

FHA0000190 Programming, 3 cr

The student is able to:

Having completed this course the student: knows about the different stages of programme development, modular programming, file management, developed data structures and the use of sub-programme libraries
can perform high order language programming

knows the key concepts of object-based programming

Degree requirements: active participation in class teaching and exercises, and the acceptable performance of assignments and an examination.

FHA0000195 Modeling 2, 3 cr

The student is able to:

This course will be the continuum to Modeling 1. The skills of the student will increase in the area of the use of 3D models like assemblies, drawings, different kind of analysis etc. Also the knowledge of the intelligence of 3D models will include to the course.

Keywords: technology, mechanical engineering, technical documents, 3D modeling

FHA0000197 Design for Manufacturability and Assembly, 3 cr

The student is able to:

The competitiveness of a product depends on good construction and the right manufacturing methods. The student will learn to design with the product specifications, which allow for efficient, trouble free and economical manufacturing and assembly.

Keywords: technology, mechanical engineering, design for manufacturing (DFM), design for assembly (DFA)

FHA0000200 Professional Mathematical Methods, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa kuvailla useanmuuttujan funktion peruskäsitteitä sekä niiden soveltamisen teknisiin ongelmiin

osaa määritellä differentiaaliyhtälöiden käsitteen ja käyttää alkeellisia differentiaaliyhtälöiden ratkaisumenetelmiä

osaa kuvailla keskeisiä differentiaaliyhtälöiden sovelluksia

osaa ja ymmärtää oman ammatin alansa keskeisiä matemaattisia menetelmiä ja niiden käyttöä erilaisten ongelmien ratkaisussa.

FHA0000201 Entrepreneurial activities, 3 cr

The student is able to:

Opintojakson tavoitteena on että opiskelija tunnistaa yrittäjyyden prosessin, tietää liiketoimintamahdollisuuksien ja ideoiden hyödyntämisen ja tuottamisen ja osaa ideoiden muuttamisen toiminnaksi.

Opiskelija tuntee yrittäjyyden prosessin ja yrittäjyyden merkityksen kansantaloudelle
Opiskelija osaa kehittää ja tuottaa liikeidean liiketoimintamahdollisuuden hyödyntämiseksi.
Opiskelija tunnistaa yrittäjyyden ja yrittäjämäisen toiminnan ydin taidot kuten päätöksen teko, riskin ottaminen, luova ongelman ratkaisu, liiketoimintasuunnittelu ja vuorovaikutustaidot
Opiskelija osaa hyödyntää tietoa eri tietolähteistä, myös tulevaisuustietoa
Opiskelija osaa toimia päämäärätietoisesti osana ryhmää

FHA0000205 Basics of Urban Planning, 4 cr

The student is able to:

The aim of this course is to familiarise the student with the basics of the planning of municipal and built environments and the formation of municipal expenditure. Having completed this course, the student knows the significance of the community planning system and urban planning, different components and phasing in traffic infrastructure construction.

FLM0000038 Environmental technology and research, 5 cr

The student is able to:

Student ©is able to discuss the possibilities of using environmental friendly technical solutions in urban settings ©is able to discuss current research in the field and needs for future research ©is able to collect information of different technologies and evaluate their impacts ©is able to develop applications of the field to existing situations

FLM0000039 Urban and communicative planning, 5 cr

The student is able to:

The student ©- is able to analyze and discuss contemporary phenomena like urbanization and urban sprawl, transitions in urban areas, energy efficiency in planning, climate change and its effects, collaboration of professionals and stakeholders ©- is able to discuss current theoretical discussion of planning including the role of the planner and planning profession ©- is able to use of EIA (Environmental Impact Assessment) and its different aspects in planning process ©- is able to evaluate recent planning processes, their management and arrangement of participation in the processes ©- is able to reflect environmental issues from the professional point of view ©- is able to develop applications from theoretical background into practical situations

FLM0000040 Climate change and its environmental impacts, 5 cr

The student is able to:

Student ©is able to describe carbon cycle and discuss climate change issues ©is able to survey the EU impacts on reduction of carbon emissions in the future and analyze their consequences ©is able to discuss current possibilities for climate change mitigation in urban settings ©is able to search for information and scientific research results concerning the climate change topics ©is able to develop applications of mitigation in urban settings

FLM0000041 Environmental management, 5 cr

The student is able to:

Student ©is able to analyze the impacts of environmental legislation in organisations' policy and actions ©is able to compare the environmental management systems in different organisations ©is able to discuss the requirements of environmental impact assessment connected to major building projects ©is able to present case studies applications of environmental management

FLM0000042 Future workshop, 5 cr

FHA0000206 Traffic Planning Software, 5 cr

FHA0000217 Working in Project Business, 3 cr

FHA0000218 Design Project, 12 cr

The student is able to:

Työelämäprojekti on ulkopuolisille toimeksiantajille tehtävä tuotekehitysprojekti. Keskeistä projektityön läpiviennissä on monialainen tiimityö, jossa eri alan opiskelijat ratkovat yhdessä pienryhminä toimeksiantajien tuotekehitysprosesseihin liittyviä haasteita. Pedagogisena lähtökohtana on tutkiva oppiminen.

Opiskelija oppii ottamaan huomioon suunnittelutehtäviin liittyviä ulkopuolisia rajoituksia ja vaatimuksia. Hän tuntee tuotesuunnittelutyön metodologiaa ja ymmärtää suunnitteluprosessin läpiviennin sen eri välivaiheineen.

Opintojen aikana opiskelija tutustuu projektimuotoiseen toimintaan, sen suunnitelmalliseen organisointiin ja johtamiseen. Hän osaa tehdä projektisuunnitelman, keskeisiä teemoja ovat projektisuunnittelu, työroolit projektissa, projektin ositus, aikataulutus ja resurssointi sekä projektin läpivienti.

FHA0000219 Traffic Planning Project, 12 cr

The student is able to:

A working life project is a planning or research project commissioned by an external organisation. The pedagogical starting point is research-based learning. The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about traffic planning methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. He/she can make a project plan. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0000220 Software Development Project, 12 cr

The student is able to:

A Software Engineering project is a product development project commissioned by an external organisation. Key to the performance of the project is diverse teamwork, in which students form small groups to address software development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the software design. They learn to apply sound software production methodologies and understand how to carry out a design process with its different intermediate stages. The students get to know about project-based work, its systematic organisation and management and how to make a project plan. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FLM0000153 Swedish Written Swedish Language Written Skills, 1.5 cr

FLM0000154 Swedish Spoken Swedish Language Oral Skills, 1.5 cr

FHA0000285 Hydraulics and Pneumatics in Machine Automation, 6 cr

The student is able to:

The student will be able to apply the basics of hydraulics and pneumatics and their relation to machine automation,

as well as the fundamentals of the most common components and their applications. The student will be able to justify the choice of component to the operation of the system through engineering calculations, choose the appropriate components required in the construction of simple pneumatic or hydraulic circuits also taking into consideration the basics of sequencing.

FLM0000194 Differential and integral calculus, 4 cr

FLM0000195 Descriptive geometry and perspectives, 3 cr

FLM0000196 Chemistry, 3 cr

FLM0000209 Plastics engineering lab, 5 cr

FLM0000210 Research and development project, 3 cr

FLM0000211 Mechanisation Units, 3 cr

FLM0000212 Project 2, 7 cr

FLM0000213 WWW project, 5 cr

FLM0000214 Digital photography and image processing, 6 cr

FLM0000215 Vector graphics, 6 cr

FLM0000216 Research project, 4 cr

FLM0000217 Commercial and industrial areas, 10 cr

FLM0000218 Physics for environmental technology II, 3 cr

FLM0000219 Chemistry for environmental technology, 3 cr

FLM0000220 Waste, Energy and Water Management, 6 cr

FLM0000221 Construction materials and manufacturing technology, 3 cr

FLM0000222 ICT-Mathematics, 4 cr

FLM0000223 Introduction to Programming, 4 cr

FLM0000224 WWW Technologies, 4 cr

FLM0000225 ICT-Mathematics, 4 cr

FLM0000226 Basics of Programming, 4 cr

FLM0000227 WWW Technologies, 4 cr

FLM0000228 Residential Surroundings, 5 cr

FLM0000230 Planning of landscapes and immediate surroundings, 5 cr

FLM0000231 German language, 3 cr

FLM0000232 English language and communicationEnglish Language, 3 cr

FLM0000236 Preliminary course for SwedishIntroduction to Swedish Language, 3 cr

FLM0000241 Physics Labs, 3 cr

FLM0000242 Integral and Differential Calculus, 3 cr

FLM0000243 Mechanics, 3 cr

FLM0000244 Electricity and magnetism, 4 cr

FLM0000245 Mathematical Statistics I, 3 cr

FLM0000246 Environmental ICT project 2, 3 cr

FLM0000249 Energy and environmental issues, 4 cr

FLM0000250 Maintenance, 3 cr

FLM0000251 Company projects, 4 cr

FLM0000252 English for mechatronics, 3 cr

FLM0000253 Electric motor drives, 3 cr

FLM0000258 Information security and networks, 3 cr

FLM0000259 Wireless networks project , 3 cr

FLM0000260 Network management systems, 3 cr

FLM0000261 Digital technology, 3 cr

FLM0000262 Electronic circuits, 3 cr

FLM0000263 Town Planning, 5 cr

FLM0000264 Life cycle analysis of bio fuels, 3 cr

FLM0000265 Project: sustainable development in urban ecosystems, 3 cr

FLM0000266 International treaties and legislation, 3 cr

FLM0000268 Environmental systems and quality systems , 3 cr

FLM0000269 Soil and landfill sampling, measurements and analyses , 4 cr

FLM0000270 Geographical Information, 3 cr

FLM0000271 Remediation of contaminated soil, 6 cr

FLM0000272 Energy sources of the future, 3 cr

FLM0000273 Planning the use and maintenance of water systems, 6 cr

FLM0000274 Community Planning, 3 cr

FLM0000275 Wood as raw material, 4 cr

FLM0000276 Wood product project, 4 cr

FLM0000277 Jointing techniques, 2 cr

FLM0000278 Machinery in the plastics industry, 3 cr

FLM0000279 Plastic as material, 4 cr

FLM0000281 Machine embroidery, 3 cr

FLM0000282 Textile materials and structures, 4 cr

FLM0000283 Development and manufacture of the structures of outdoor clothing, 6 cr

FLM0000284 Physics for textile and clothing technology, 5 cr

FLM0000285 Chemistry for textile and clothing technology, 6 cr

FLM0000286 Basics of clothing shapes, 3 cr

FLM0000287 Basics of garment manufacture, 5 cr

FLM0000288 Clothing workshop, 3 cr

FLM0000289 Green ICT Project 2, 3 cr

FLM0000290 Communicating your expertise, 4 cr

FLM0000292 GIS in environmental planning and research, 5 cr

FLM0000299 ICT English, 3 cr

FLM0000300 Geometry and Trigonometry, 3 cr

FLM0000301 Geometry and trigonometry, 3 cr

FLM0000302 Continuation course in ICT mathematics, 4 cr

FLM0000303 Mathematical statistics II, 3 cr

FLM0000304 Management and production control, 3 cr

FLM0000305 English for plastics engineering, 3 cr

FLM0000306 Business economics, 2 cr

FLM0000307 Trade and contract law, 3 cr

FLM0000308 Board technology, 3 cr

FLM0000309 English for wood technology, 3 cr

FLM0000310 Production of wood constructions, 3 cr

FLM0000311 Technical construction timber products, 3 cr

FLM0000312 Plywood technology, 4 cr

FLM0000313 Digital technology, 2 cr

FLM0000314 Hydraulics, 2 cr

FLM0000315 Joints and machine components, 2 cr

FLM0000316 Material and manufacturing technology I, 4 cr

FLM0000317 Continuation course in programming (C language), 3 cr

FLM0000327 Control Design Basics, 4 cr

FLM0000328 Robotics Advanced Course, 3 cr

FLM0000329 Basics of robotics, 3 cr

FLM0000330 Use of electrical design software, 3 cr

FLM0000331 Electrical Design Basics, 3 cr

FLM0000332 Management Advanced Course, 3 cr

FLM0000333 Quality engineering, 2 cr

FLM0000334 Business plan, 3 cr

FLM0000335 Plant layout planning 2, 3 cr

FLM0000336 Architecture project, 5 cr

FLM0000337 Distributed and mobile systems, 3 cr

FLM0000338 Distributed and mobile systems, 5 cr

FLM0000339 Programming methodsProgramming methods, 3 cr

FLM0000340 Software engineering project, 3 cr

FLM0000341 Software production , 3 cr

FLM0000342 Software production , 5 cr

FLM0000351 Real-time systems, 4 cr

FLM0000352 Data structures and algorithms, 4 cr

FLM0000357 Programming workshop, 3 cr

FLM0000358 Maintenance and testing of software products, 5 cr

FLM0000359 Digital signal processing, 4 cr

FLM0000360 Electronic components and documentation, 4 cr

FLM0000361 Dedicated programming, 3 cr

FLM0000362 Microprocessors in embedded systems, 5 cr

FLM0000363 Programmable circuits, 5 cr

FLM0000364 Audio applications of signal processing, 3 cr

FLM0000365 Electrical measurement technology and electronics lab, 3 cr

FLM0000366 Signal processors Signal processors , 5 cr

FLM0000367 Filter designFilter design, 3 cr

FLM0000368 Data transfer in embedded systems, 3 cr

FLM0000369 Information security and networks, 4 cr

FLM0000370 Wireless transfer technologyWireless transfer technology, 5 cr

FLM0000371 Server systems and virtualization, 4 cr

FLM0000372 Routing networks, 4 cr

FLM0000373 Telecommunications technology workshop 1, 3 cr

FLM0000374 Telecommunications technology workshop 2, 5 cr

FLM0000375 Data transfer technology, 3 cr

FLM0000376 Telecommunications solutions in companies, 4 cr

FLM0000377 Network services of companies, 4 cr

FLM0000378 3D Animation I, 5 cr

FLM0000379 3D Modelling I, 5 cr

FLM0000380 CAD I, 5 cr

FLM0000381 Interactive presentations, 5 cr

FLM0000382 Project workProject work, 5 cr

FLM0000383 WWW Multimedia, 3 cr

FLM0000384 WWW programming, 5 cr

FLM0000385 Visual communicationVisual communication, 3 cr

FLM0000386 Visualization workshop III, 5 cr

FLM0000387 Green ICT Industrial Project, 3 cr

FLM0000388 Industrial networks, 5 cr

FLM0000402 Preliminary course for English, 3 cr

FLM0000403 Marketing and management, 4 cr

FLM0000404 Data networks basics, 4 cr

FLM0000405 Town planning, 4 cr

FLM0000406 English for environmental planning, 3 cr

FLM0000407 Design workshop, 3 cr

FLM0000408 Traffic environments, 3 cr

FLM0000409 Life cycle analysis of products and services, 5 cr

FLM0000410 Bioenergy and other renewable energy sources, 4 cr

FLM0000411 Residential environments, 5 cr

FLM0000412 CAD I Design, 3 cr

FLM0000413 Life cycle thinking and material efficiency, 3 cr

FLM0000414 Air protection and emission measurements, 6 cr

FLM0000415 Landscape in Land Use Planning, 5 cr

FLM0000416 Built environment and communities, 5 cr

FLM0000417 Water sampling, field measurements and analyses, 3 cr

FLM0000418 Assessment of Environmental Impact, 3 cr

FLM0000419 Environmental Legislation and Administration, 3 cr

FLM0000420 Physics lab course, 3 cr

FLM0000421 Mechanics, 3 cr

FLM0000422 Technical drawing, 4 cr

FLM0000423 Industrial automation lab, 3 cr

FLM0000424 Entrepreneurship studiesStudies in Entrepreneurship, 4 cr

FLM0000425 Heat Energy, 3 cr

FLM0000426 Marketing and brand building, 3 cr

FLM0000427 Projects and managment, 3 cr

FLM0000428 Textile ecology and ethical issues, 3 cr

FLM0000429 2D Animation, 3 cr

FLM0000430 Energy technology, 3 cr

FLM0000431 Environmental chemistry and ecotoxicology, 3 cr

FLM0000432 Laboratory methods in environmental research, 3 cr

FLM0000433 CAM, 3 cr

FLM0000434 Basics of wood industry, 3 cr

FLM0000435 Sawmilling and processing of sawn goods, 3 cr

FLM0000436 Engineering design 3D CAD, 3 cr

FLM0000437 Strength of materials 2, 3 cr

FLM0000438 Plastics chemistry, 3 cr

FLM0000439 Basics of pattern techniques, 3 cr

FLM0000440 Basics of manufacturing technology, 3 cr

FLM0000441 Testing of textiles, 3 cr

FLM0000442 Advanced course in transducer technology, 3 cr

FLM0000443 Supplementary studies in Swedish, 3 cr

FLM0000444 German language, 3 cr

FLM0000445 Continuation course on SolidWorks, 3 cr

FLM0000446 Basics of German, 3 cr

FLM0000447 Basic Russian, continuation course 1, 3 cr

FLM0000448 Basics of Russian, 3 cr

FLM0000449 Basic course of Russian, 3 cr

FLM0000450 Russian Environmental Week, 3 cr

FLM0000451 Elective course in entrepreneurship and innovation, 3 cr

FLM0000452 Management of cultural landscapes, 3 cr

FLM0000453 Using sources, 3 cr

FLM0000454 Physics for environmental technology, 3 cr

FLM0000455 Municipal Engineering and Designing of Networks, 3 cr

FLM0000493 Basics of physics and mechanics, 5 cr

FLM0000494 Basic course in physics, 5 cr

FLM0000495 Chemistry, 5 cr

FLM0000496 Management and quality, 2 cr

FLM0000155 Professional Communication (Finnish)Professional Communication (Finnish), 3 cr

FHA0000318 Electronics Applications in Automation Engineering, 3 cr

The student is able to:

Students know the components and simple switching diagrams in electronics. They can design a small electronic device. Students know how to evaluate the use of microcontrollers for embedded automation solutions. They know the structure of microcontrollers as well as their hardware functions.

FHA0000247 Cloud Services, 3 cr

The student is able to:

The student will become familiar with programming parallel and distributed systems and the problems related to that. The student knows different solutions for realising parallel computing and knows their pros and cons. The student becomes familiar with asynchronous data streams and the principles of planning error tolerant systems. The student will learn throughly some library or platform that is developed for distributed computing or cloud services.

FHA0000248 Game Design and Programming, 3 cr

The student is able to:

The student will learn about the history and current stage of video games. The student is able to make the design documentation for a game and understands the factors related to the mechanics and gameability. The student can make level design of some existing game. The student is able to evaluate and test games critically. The student can implement simple 2D or 3D games using suitable libraries. The student can make applications with interactive voice and becomes familiar with artificial intelligence in games. The student will learn about different models for delivering and publishing games.

FHA0000249 Videotuotanto, 3 cr

The student is able to:

Tavoitteena on, että opiskelija perehtyy digitaalisen videon tuotannossa käytettäviin tekniikoihin ja järjestelmiin. Opiskelija tuntee tuotantoprojektin käytännöt ja työvaiheet. Opiskelija perehtyy niin videon jälkikäsittelyyn kuin live-tuotantoympäristöön. Opiskelija osaa tehdä monikameratuotantoympäristöön soveltuvia laitteisto- ja ohjelmistomäärittelyjä. Opiskelija ymmärtää videosignaalin siirtämisen tekniikat. Opiskelija osaa hyödyntää chroma key tekniikkaa videotuotannossa. Opiskelija ymmärtää ja osaa hyödyntää dynaamisesti muotoutuvia streameja. Opiskelija osaa hyödyntää erilaisia palvelinalustoja ja tekniikoita videon jakelussa. Opiskelija osaa käyttää CDN rakenteita.

FHA0000245 Controlling Applications in Local Area Networks, 3 cr

The student is able to:

The student knows and is able to use the controlling applications in local area networks.

FHA0000244 Local Area Network Analysing and Monitoring Applications, 3 cr

The student is able to:

The student knows and is able to use the most usual analyzing and monitoring applications in local area networks. The student is able to apply the applications in maintaining and controlling the local area network. The student is able to notice the most usual problems and errors in the use of local area network.

FHA0000246 IP SMART - Smart Devices and Product Development, 4 cr**The student is able to:**

The major objectives of the planned intensive programme are: 1.) To draw the students' attention to the importance of creativity in design. 2.) To acquaint students with state-of-the-art microcontrollers, sensors and actuators and the applications found in transportation systems, automotive, heavy equipment, telecommunications, medical industry, health care and social services. 3.) To give the students the basic knowledge on software development for microcontroller applications. 4.) To give the students a possibility for hands on experimental work with state-of-the-art product prototypes during the laboratory sessions. 5.) To gather experience on leading multidisciplinary teams during the product development process.

FHA0000322 Telecommunications in Automation, 4 cr**FHA0000321 Occupational Safety, 3 cr****The student is able to:**

Opintojakson suoritettuaan opiskelija tuntee työturvallisuuslain ja sitä täydentävät valtioneuvoston päätökset ja asetukset. Opiskelija ymmärtää työturvallisuuden osana organisaation toimintaa. Opiskelija osaa työskennellä harjoittelu- ja työyhteisössä huomioiden alan työturvallisuusohjeet. Opiskelija osaa tunnistaa omat voimavaransa ja huolehtii osaltaan omasta ja työyhteisön hyvinvoinnista. Opiskelija osaa antaa ensiapua onnettomuustilanteessa, hän omaa ensiaputaidot: EA1 (16 h) tai hätäensiapu (8 h).

FHA0000323 Occupational Safety, 3 cr**The student is able to:**

Students who have completed the course are familiar with the Occupational Safety and Health Act and its supplementary decisions-in-principle and decrees. They understand the concept of occupational safety as part of an organisation's operations. They know how to work in a job placement or workplace while observing professional safety regulations. Students learn to recognise their own resources and to look after their own and their peers', well-being. They are able to give first aid in the case of accidents, having the first aid qualification EA1 (16 h) or Emergency First Aid (8 h).

FHA0000399 Energy Efficiency and Sustainable Energy in Buildings, 5 cr**The student is able to:**

Intensive course to improve students' skills and knowledge on energy efficiency and sustainability of buildings. Course contains intensive work in laboratory, measurements on building sites, workshops and excursions.

FHA0000402 Practical Automation Works, 5 cr**The student is able to:**

Students can design and implement a small-scale relay and pneumatic control system, as well as implement logic controller into an industrial setting. Students can measure basic parameters in automation data communications environment. Students can write good technical reports.

FHA0000273 Professional Skills, 3 cr**The student is able to:**

Opintojakson tavoitteena on tukea opiskelijaa opintojen tavoitteellisessa suunnittelussa sekä työelämä- ja kansainvälisyysvalmiuksien hankkimisessa.

Opintojakson tavoitteena on, että opiskelija analysoi omia valmiuksiaan suhteessa ammattialansa eri työtehtävien vaatimuksiin

osaa toimia työelämässä ja tietää suomalaisen työlainsäädännön

osaa hakea harjoittelu- ja työpaikkoja

osaa käyttää eri CV- ja työnhakupalveluja verkossa

toimii tiimeissä ja verkostoissa

osaa kansainvälisyyskehityksen vaikutukset omalla ammattialallaan

tunnistaa kansainvälistymisestä aiheutuvat kehittämistarpeet omassa osaamisessaan

osaa tarkentaa omaa ammatillista kehityspolkuaan ja suunnata omia valintojaan

päivittää ja ylläpitää omaa HOPSia opiskelutilanteiden muutosten mukaan

FHA0000403 Applied Mathematics, 3 cr

The student is able to:

Students know the methods used when analysing linear space-time continuum and discrete time systems. Students know spectrum analysis and mathematics in connection with automation engineering.

FHA0000404 Engineering Physics, 3 cr

The student is able to:

Having completed the course, students:

know phenomena created by electric charges: electric fields, magnetic fields and electromagnetic vibrations and waves

know force interactions of fields in different applications

can apply the most common calculation methods to analyze waves and fields

know the surface phenomena and propagation principles of waves

can apply the law of induction in different practical applications

know the working principles of different electrical components

know the principles of mechanical vibrations and waves

can apply the most common calculation methods to model and analyze mechanical vibrations

know the surface phenomena and propagation of mechanical waves

know the dynamic range of pressure waves and the decibel scale

know resonance phenomena both in mechanical and electrical systems.

FHA0000405 Physics Laboratory, 3 cr

The student is able to:

Having completed the course, students:

know the physical principles of different measurements and measurement systems

can plan different measurement arrangements and understand the importance of calibration of measurement devices

know mathematical models of measurement systems as well as the connection between mathematical models and measurement practice

can estimate errors of single measurements and errors of measurement systems

can use the most common computer-based calculation (correlation method, curve fitting methods and common statistical methods) methods to analyze measurement results and to estimate errors

can handle measurements results in a recommended way, use graphical methods, tables and models to represent their measurement results

can write technical reports of high quality.

FHA0000027 Swedish preparatory studies, 3 cr

The student is able to:

The student can use basic Swedish grammar and vocabulary.

FHA0000006 Research and development skills, 3 cr**The student is able to:**

Opintojakson tavoitteena on syventää opiskelijan tuntemusta oman alansa tutkimuksesta ja kehittämistoiminnasta. Opiskelija osaa soveltaa analyyttistä, tutkivaa ja reflektoivaa työskentelyotetta ammattialansa kehittämisessä. Opiskelija osaa oman alansa tutkimus- ja kehitystyön menetelmiä ja ymmärtää tutkimusprosessin toteutuksen. Opiskelija osaa yleisimmät alansa tutkimus- ja kehittämistyön suullisen, kirjallisen, kuvallisen tai toiminnallisen esittämisen ja raportoinnin muodot.

FHA0000406 Life Cycle Thinking, 4 cr**FHA0000407 Process Technology, 4 cr****FHA0000409 Measuring and Automation Programs, 4 cr****FHA0000410 Measurements and Analysis, 3 cr****FHA0000411 Automation Networking, 4 cr****FHA0000028 English preparatory studies, 3 cr****The student is able to:**

The student can use basic English grammar and vocabulary.

FHA0000275 Professional English, 3 cr**The student is able to:**

Opiskelija osaa

kommunikoida suullisesti vaativammissa alakohtaisissa vuorovaikutustilanteissa
tuottaa erilaisia alakohtaisissa työelämän tilanteissa vaadittavia dokumentteja
käyttää melko laajaa alakohtaista sanastoa
käyttää erilaisia tieto- ja viestintätekniikan työkaluja sosiaalisessa ja ammatillisessa kommunikoinnissa
toimia monikulttuurisissa työyhteisöissä
Tavoitteena on, että opiskelija saavuttaa Eurooppalaisen viitekehyksen B2-taitotasoa vastaavan osaamisen.

FHA0000415 Instrumentation, 3 cr**The student is able to:**

Upon completion of course students know the basic connection principles of field devices in process automation. They know industrial valves, their application methods, measuring transducers and transmitters, as well as implementing these into the process. Students know how to use instrumentation cables for different target areas taking into account earthing and bonding principles. Students know the installation principles used in the hazardous areas.

FHA0000413 Application Programming, 4 cr

The student is able to:

Students know the basis of systems application engineering and can program small-scale applications into the system. They are familiar with planning tools in distributed control system and know the methods of configuration.

FHA0000416 Fundamentals of Maintenance, 3 cr**The student is able to:**

Students know the fundamentals of industrial maintenance and can do a small maintenance application for industrial production line. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000417 Technology Application in Automation, 4 cr**The student is able to:**

Students can design and implement a new technology based automation application. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000418 Field Design, 4 cr**The student is able to:**

Students know the basics of field instrumentation as well as typical circuit structures. Students can produce process automation field design using the CAD system as a standard. Students know the documentation needed for field design.

FHA0000420 Electrical Drives, 3 cr**The student is able to:**

Having completed the course, students:

can size the power needed in electrical drives with the aids of physical bases

know functions of electrical drives and can design the right device power according the demands of application target

can do application programming, testing and implementation of electrical drive and servos.

FHA0000421 Automation Applications in Graphical Development Environment, 4 cr**The student is able to:**

Students can design and implement a new automation application on graphical programming environment. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000422 Automation Application in Software Environment, 4 cr**The student is able to:**

Students know the automation software environment and can design and implement a small automation application on it. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000425 Control Engineering, 4 cr

FHA0000424 Applied Mathematics, 3 cr

FHA0000426 Fieldbuses, 3 cr

FHA0000427 Automation Technology Project Work 2, 6 cr

FHA0000428 Life Cycle Thinking, 4 cr

FHA0000429 Process Technology, 4 cr

FHA0000430 Maintenance, 4 cr

FHA0000431 Project of Maintenance Work, 3 cr

FLM0000554 Ravinteiden talteenotto ja energian tuotanto jätevesistä levien avulla , 5 cr

FLM0000555 Development Management Project, 5 cr

FLM0000556 3d printing, 3 cr

FHA0000519 Professional English, 3 cr

The student is able to:

The student should achieve an oral and written level of English with which he/she can communicate in a demanding field specific working environment. The student also has knowledge of his/her own field-specific terminology and is able to utilise his/her language skills in tasks requiring expertise.

Contents:

- 1) focus on field-specific terminology
- 2) applying for work
- 3) situations from the working environment

FHA0000520 Professional Skills, 3 cr

The student is able to:

The course aims at supporting the students in the goal-oriented planning of their studies and in gaining skills needed at the workplace and internationally.

The aim of the course is that the students

analyse their own skills in relation to the requirements of different tasks of their professional field,
understand the rules and regulations of the Finnish workplace,
can search for work placements and jobs,
can use different online CV and job search engines,
work in teams and networks,
understand the effects of internationalisation on their own professional field,
recognise what competences need to be developed due to internationalisation,
can specify their own professional development paths and on this basis make their own choices, and
update and maintain their own PSP according to the changing situations in their studies.

FHA0000521 Electrical Power Engineering, 6 cr

The student is able to:

Having completed the course, students:

know the structure of an power distribution network and main generation systems
know potential disturbances in the network and the correct methods for avoiding these
know the basic concepts of electrical safety and can follow safety procedures in electrical work
know grounding methods in electrical power networks
can calculate symmetric three-phase system design calculations
know magnetism basic concepts and can apply these to electric machines
can choose the correct electric drive and use of electricity for a specific purpose.

FHA0000522 Application Programming, 4 cr

The student is able to:

Students know the basis of systems application engineering and can program small-scale applications into the system. They are familiar with planning tools in distributed control system and know the methods of configuration.

FHA0000523 Field Design, 4 cr

The student is able to:

Students know the basics of field instrumentation as well as typical circuit structures. Students can produce process automation field design using the CAD system as a standard. Students know the documentation needed for field design.

FHA0000524 Electrical Design, 4 cr

The student is able to:

Having completed the course, students:

know the basics of industrial electricity systems
can design industrial main and control circuit diagrams using computer software
can design and size electric controls for motor outputs
know the legislation and documentation in connection with electrical installations.

FHA0000525 Engineering Physics, 3 cr

The student is able to:

Having completed the course, students:

know phenomena created by electric charges: electric fields, magnetic fields and electromagnetic vibrations and waves
know force interactions of fields in different applications
can apply the most common calculation methods to analyze waves and fields
know the surface phenomena and propagation principles of waves
can apply the law of induction in different practical applications
know the working principles of different electrical components
know the principles of mechanical vibrations and waves
can apply the most common calculation methods to model and analyze mechanical vibrations
know the surface phenomena and propagation of mechanical waves
know the dynamic range of pressure waves and the decibel scale
know resonance phenomena both in mechanical and electrical systems.

FHA0000526 Physics Laboratory, 3 cr

The student is able to:

Having completed the course, students:

know the physical principles of different measurements and measurement systems

can plan different measurement arrangements and understand the importance of calibration of measurement devices

know mathematical models of measurement systems as well as the connection between mathematical models and measurement practice

can estimate errors of single measurements and errors of measurement systems

can use the most common computer-based calculation (correlation method, curve fitting methods and common statistical methods) methods to analyze measurement results and to estimate errors

can handle measurements results in a recommended way, use graphical methods, tables and models to represent their measurement results

can write technical reports of high quality.

FHA0000528 Automation Applications in Graphical Development Environment, 4 cr

The student is able to:

Students can design and implement a new automation application on development environment. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000529 Automation Application in Software Environment, 4 cr

The student is able to:

Students know the automation software environment and can design and implement a small automation application on it. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0000530 Research and development skills, 3 cr

The student is able to:

The course aims at helping the students to deepen their knowledge of research and development in their own field.

The students can adopt an analytical, investigative and reflective working attitude in order to develop their professional skills. The students master research and development methods in their field and understand the implementation of the research process. The students know the most common forms of oral, written or visual presentations and reports concerning research and development in their field.

FHA0000531 Automation Project Work 3, 4 cr

The student is able to:

Learning outcomes: Students attain the demands of project work. The demands are made according to the needs of the project customer.

FHA0000532 Maintenance Project, 3 cr

The student is able to:

Learning outcomes: Students know how to apply the knowledge that they have acquired during the module towards efficient production through developing the maintenance operations of a company. Students get to know reliability planning and finalise independently an extensive maintenance project in an industrial setting. Students know how to manage small-scale maintenance projects - as well as know how to conduct meetings and reports related to these.

FHA0000550 Human Machine Interface, 4 cr

The student is able to:

A student can use and configure human machine interfaces used in industrial automation. A student has an overall view how to exploit human machine interfaces in different automation system environments. A student can design and implement a small scale human machine interface application and pilot it in a laboratory setting.

FHA0000551 Networks in Automation, 4 cr

The student is able to:

Opiskelija tietää, miten nykyaikainen, avoin automaatiojärjestelmä on toteutettu ja miten se toimii. Opiskelija tuntee informaatioteknologian käyttömahdollisuudet teollisuuden automaatioissa. Opiskelija tietää erilaisten automaatiolaitteiden ja -järjestelmien välisessä tiedonvälityksessä käytettävien menetelmien toteutustapoja ja käyttösovelluksia .

FHA0000552 Robotics, 4 cr

The student is able to:

A student knows the terminology of robotics, the most popular types of robots and their typical application possibilities. A student can use a robot and make a small application program for it. A students can estimate the economical benefits of using robots.

FHA0000553 Machine Vision, 3 cr

The student is able to:

Opiskelija tietää konenäön sovellusalueita. Opiskelija osaa konenäössä käytettävän kuvankäsittelyn teoreettisen perustan. Opiskelija tietää tuotantoautomaatioissa käytettävän konenäön suunnittelumenetelmiä. Opiskelija osaa tehdä pienimuotoisen konenäkösovelluksen laboratorioympäristössä.

FHA0000554 Simulation in Production, 6 cr

FHA0000557 Graduation Thesis, 15 cr

The student is able to:

The thesis is a comprehensive and independent design, research or development work/project/study where a student exploits the most essential fields of Automation Engineering degree programme. The thesis is done mainly for industrial life, occasionally also for the Automation Engineering degree programme and always under supervision of an instructor. In addition, the thesis comprises participation in supervision sessions in groups and individually, required seminars and public examination. The purpose of the thesis is to prepare the student to work logically and systematically, to search for and use reference materials, to combine theoretical knowledge, to use appropriate methods, to get practice in producing scientific text and graphics, and to improve his/her oral presentation skills.

FHA0000560 Human Relations, 4 cr

The student is able to:

Mihin tiimityö sopii, mihin ei? Miten tiimi muodostetaan, miten tiimis-sä työskennellään ja miten tiimiä johdetaan? Millaisia ongelmia tiimit kohtaavat, millaiset tiimit menestyvät? Edellä on esitetty kysymyksiä, joihin opintojaksolla etsitään vastauksia - tiimityönä.

Asiasanat: tekniikka, logistiikka, sivuaineopinnot, tiimityö

FHA0000563 Laitesuunnittelu, 5 cr

The student is able to:

Tavoitteena on, että opiskelija hallitsee elektronisten laitteiden suunnittelun periaatteet.

Osaamisvaatimukset:

Opiskelija:

- ymmärtää vaatimusmäärittelyn merkityksen ja asiakkaan tarpeet
- tuntee kelpoisuussuunnittelun periaatteet
- tuntee elektroniikan protoilun menetelmiä
- tuntee häiriöiden torjunnan laitetasolla
- tuntee ympäristötekijöiden merkityksen suunnittelussa

FHA0000412 Project of Maintenance Work, 3 cr**FHA0000527 Electrical Drives, 3 cr****The student is able to:**

Having completed the course, students:

can size the power needed in electrical drives with the aids of physical bases

know functions of electrical drives and can design the right device power according the demands of application target

can do application programming, testing and implementation of electrical drive and servos.

FHA0000586 Robotics, 4 cr**FHA0000588 Electrical Installations, 3 cr****The student is able to:**

A student knows the laws and regulations concerning electrical installations in buildings. A student can use CAD software for electricity design. A student knows the common components used in electrical installations and understand how to connect wirings.

FHA0000589 Building Automation, 5 cr**The student is able to:**

A student knows most important application areas in building control systems. A student understands principles of heating, plumbing and air conditioning automation. A student understands the principles of KNX standard based building automation and can design applications rest on this standard.

FHA0000591 Electrical Installations, 3 cr**FHA0000614 Economics, 3 cr****The student is able to:**

Objectives: The student: - is able to use, read and interpret the essential concepts of the economy - understands the basic factors in the economic fluctuations and the development of supply and demand - is able to describe the factors that influence the determination of interest rates and economic activity - understands the macro- and microeconomic and as well as political environment of a firm

FHA0000618 Business Planning, 5 cr

FHA0000619 Timber and Steel Constructions, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee puu- ja teräsrakenteiden materiaaliominaisuuksia, runkojärjestelmiä, rakennusosia, mitoitusperusteita ja rakenteiden jäykistysperusteita.

Harjoitustyönä opiskelija osallistuu asuin- ja hallirakennusten suunnitteluun ja toteutukseen.

FHA0000620 Renovation 2, 5 cr

FHA0000286 Research and Development Skills, 3 cr

The student is able to:

Opintojakson tavoitteena on syventää opiskelijan tuntemusta oman alansa tutkimus- ja kehitystoiminnasta sekä antaa valmiudet opinnäytetyön tekemiseen.

Opiskelija osaa soveltaa analyyttistä, tutkivaa ja reflektoivaa työskentelyotetta ammattialalla kehittymisessä. Hän tuntee opinnäytetyöprosessin. Näiden pohjalta hän osaa laatia opinnäytetyön aihekuvauksen.

Opiskelija osaa soveltaa oman alansa yleisimpiä tutkimus- ja kehitystyön menetelmiä sekä niiden suullisia, kirjallisia, kuvallisia tai toiminnallisen esittämisen ja raportoinnin muotoja. Näiden pohjalta opiskelija osaa tehdä opinnäytetyösuunnitelman.

FHA0000621 Mathematics 3, 3 cr

FHA0000622 Building Physics, 3 cr

The student is able to:

Opiskelija tuntee tyypillisimpien rakennusmateriaalien ääni-, lämpö- ja kosteusfysikaaliset ominaisuudet. Opiskelija tietää uudisrakentamisen ja korjausrakentamisen radontorjuntamenetelmät, tuntee työmaan laadunvalvontamittauksista: kosteusmittausmenetelmät, lämpökuvauksen, ilmaäänimittauksen, runkoäänimittauksen sekä ilmanpitävyysmittauksen. Opiskelija osaa laskea: rakenteiden U-arvon, lämpötilajakauman sekä energiatasauslaskelman. Opiskelija tiedostaa rakenteen rakennusfysikaaliset riskit.

FHA0000623 Site Practices, 3 cr

The student is able to:

Opiskelija hallitsee talonrakennustyömaiden yleisimmät tuotantotavat ja tietää rakentamisvaiheisiin tyypillisesti kuuluvat työt ja työmenetelmät erityisesti työsisällön, työkalu- ja koneiden, turvallisuuden ja laadun kannalta.

FHA0000625 Procurement and Logistics, 6 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

tuntee hankintatoimen käytännöt, tilaus- ja sopimushankinnat, pienhankinnat, toimitusten suunnittelun ja varastoinnin

tuntee hankintoihin liittyvän lainsäädännön ja säädökset sekä hankintasopimukseen liittyvät sopimusehdot esim. RYHT, KSE

osaa laatia yksittäisiä materiaalitilauksia sekä yksiselitteisiä aliurakkasopimuksia

osaa ottaa huomioon em. sopimuksissa työmaan ohjauksen kannalta oleelliset vaatimukset sekä yleisten

sopimusehtojen mukaiset vaatimukset

tuntee aliurakkasopimuslomake YSE 1998 käytön

hallitse aliurakoiden ja materiaalihankintojen ohjauksen

osaa laatia työryhmän määräaikaista työsopimuksia

osaa suorittaa urakkahinnoittelua

FHA0000624 Cost Estimating, 6 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

tuntee rakennushankkeen eri vaiheissa käytettävät kustannuslaskennan menetelmät sekä talo-nimikkeistöt

osaa tehdä kustannuslaskentaa sekä hankintojen ja tuotannon suunnittelua palvelevaa määrälaskentaa

omaa valmiuksia tuotemallista saatavan määrätiedon hallintaan

osaa hinnoitella lisä- ja muutostöitä

tuntee tavoitearvion laadinnan ja kustannusseurannan periaatteet

osaa laatia energiataloudellisten korjaustoimenpiteiden kannattavuuslaskelmia

FHA0000626 Concrete Technology, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee erilaisten betonielementtien järkevät käyttökohteet ja niiden rajoitukset. Hän osaa käyttää oikeanlaisia liitosratkaisuja erityyppisten elementtien liitoksissa.

Opiskelija tuntee yleisempien elementtien valmistustekniikat. Hän osaa huomioida elementtien pitkäaikaismuodonmuutokset elementtien välisissä liitoksissa ja tuntee liitoksissa käytetyt teräsosat.

Opiskelija tuntee jännitettyjen rakenteiden tuomat hyödyt elementtirakenteissa ja osaa hyödyntää niitä rakennuksen rungossa. Opiskelija tuntee elementtien asennustyölle asetetut vaatimukset.

FHA0000627 Concrete Structure Design, 6 cr

The student is able to:

Opiskelija ymmärtää tavallisempien teräsbetonirakenteiden toiminnan ja hänellä on käsitys teräksen ja betonin yhteistoiminnan vaatimuksista. Hän tuntee erilaiset raudoitusmenetelmät ja raudoituksina käytetyt teräslaadut ja hänellä on käsitys tuotantoystävällisestä raudoituksesta. Hänellä on peruskäsitys jännitettyjen rakenteiden toiminnasta ja suunnittelusta.

Opiskelija ymmärtää teräsbetonirakenteen muodonmuutoksen riippuvuuden ympäristöolosuhteista ja ajasta ja osaa huomioida muodonmuutokset rakenteita suunnitellessaan.

Opiskelijalle on muodostunut käsitys erilaisista teräsbetonirungoista, niiden toiminnasta ja taloudellisesta käyttöalueesta. Hänellä on käsitys yleisimpien teräsbetonirakenteiden optimaalisista poikkileikkauksista.

FHA0000628 Renovation 1, 5 cr

FHA0000629 Mathematics 2, 3 cr

FHA0000631 Safety at Construction Site, 4 cr

FHA0000630 Economics of the Construction Industry, 4 cr

The student is able to:

Opintojakson suoritettuaan opiskelija ymmärtää rakennushankkeen eri osapuolien tehtävät, velvollisuudet ja vastuut. Hän tuntee rakennusurakan yleisten sopimusehtojen, urakkamuotojen ja urakkasopimusten keskeisen sisällön. Lisäksi hän tuntee rakennushankkeen suunnitteluvaiheen hanketalouden perusteet sekä tavoitehintalaskelman ja rakennusosa-arvioarvion laadinnan perusteet.

FHA0000632 Contracts and Legislation, 3 cr

The student is able to:

Opintojakson tavoitteena on perehdyttää rakentamista ohjaavaan lainsäädäntöön ja lupakäytäntöihin. Samalla vahvistetaan tietämystä mm. asuntokauppalaista ja opiskelija saa perusvalmiudet toimimiseen työnantajan edustajana rakennustyömaalla.

FHA0000634 Basics of Structural Engineering 1, 4 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

laskee yksinkertaisen sauvarakenteen tukireaktiot ja piirtää sen rasituskuviot

hahmottaa kiinteiden kappaleiden mekaanisen käyttäytymistavan veto-, puristus-, leikkaus- ja taivutusrasituksen alaisena

laskee perustapausten, kuten veto- ja puristussauvojen ja suorien palkkien, jännitykset ja siirtymät

tuntee normiohjauksen ja rakenteiden suunnittelun peruseriaatteen

määrittää rakenteisiin kohdistuvat tyypillisimmät kuormat

suunnittelee omakoti- ja rivitalon yksinkertaiset kantavat puurakenteet

SISÄLTÖ:

Statiikan peruslait, tasapainoyhtälöt, voiman jako komponentteihin ja voimien yhdistäminen, tukireaktiot, sauvarakenteiden rasitukset ja rasituskuviot, jännitys- ja venymäkäsittely, Hooken laki, normaalijännitys, leikkausjännitys, taivutusjännitys, rakentamisen normiohjaus, suunnittelijan pätevyys, rakenteiden kuormat ja kuormitusyhdistelmät, rajatilamitoitus.

FHA0000633 Soil Construction, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa soveltaa geotekniikan taitojaan erilaisten maanvaraisten tai paalutettujen rakenteiden mitoittamiseksi. Lisäksi opiskelija pystyy laskemaan maarakenteiden vaatimien leikkaus- ja täyttötöiden kuutio- ja tonnimääriä sekä osaa laatia em. tietojen perusteella kustannusarvioita maarakennustöille. Opiskelija osaa myös mitoittaa maarakenteita niiden E-moduulien ja rakeisuusominaisuuksien perusteella.

FHA0000635 Electric Systems of Buildings, 3 cr

The student is able to:

Opiskelija osaa sähkötekniikan perusteita. Hän tuntee rakennusten sähköturvallisuuden, sähköjärjestelmien ja työmaan sähköasennusten perusteet. Lisäksi opiskelija osaa tulkita rakennuksilla esiintyviä sähköjärjestelmien piirustuksia.

FHA0000637 Site Planning, 4 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa laatia työmaan alue-, kalusto-, henkilöstötila-, jätehuolto- ja sähköistysuunnitelman
tuntee rakennuskoneet ja laitteet sekä niiden turvallisen käytön sekä työmaan lämmitys ja kuivauskaluston ja niiden käytön
hallitsee rakennusmateriaalien ja rakenteiden suojaamisen
tuntee työtelineet ja osaa tehdä työtelineetarkastuksen
tuntee työmaan logistiset ratkaisut
osaa valita työmaalle soveltuvan nosturin sekä telineet
tuntee työmaan perustamiseen liittyvät toimet ja luvat
tuntee työnaikaisen pölynhallinnan

FHA0000640 Production Management, 6 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa valita työkohteeseen sopivan aikataulumuodon
osaa laatia työmaan ohjaukseen soveltuvan aikataulun ja varmistaa aikataulun toteuttamis- ja ohjausedellytykset
osaa toimeenpanna ja valvoa aikataulun toteutumista
osaa käyttää vinoviiva aikataulutekniikka (paikka-aikakaavio) sekä tuntee vinjettivalvonnan
osaa käyttää RATU -tiedostoja (aikataulukirja, menekkitiedostot)
osaa suunnitella ja projektikohtaiset laadunvarmistustoimenpiteet sekä koko hanketta että yksittäistä tehtävää koskien
osaa varmistaa, että laadunvarmistustoimenpiteet ovat käytännönläheiset ja yksiselitteiset
osaa toimeenpanna laadunvarmistustoimenpiteet sekä välittää laatuvaatimukset työn toteuttajille

FHA0000641 Concrete Construction, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee eri betonilaadut ja niiden järkevät käyttökohteet. Hän tuntee miten betonimassan ja kovettuneen betonin ominaisuuksiin voidaan vaikuttaa osa-aineiden erilaisilla suhteilla ja lisäaineilla. Hän osaa varautua talviolosuhteiden betonoinnille asettamiin vaatimuksiin ja hänellä on käsitys betonin lujuudenkehityksestä erilaisissa olosuhteissa. Opiskelija osaa valita kuhunkin käyttötarkoitukseen parhaiten sopivan muottijärjestelmän. Opiskelija tunnistaa raudoituksen merkityksen rakenteen toiminnalle. Hän tuntee eri rasitusluokat ja osaa huomioida niiden vaikutuksen teräsbetonirakenteiden toteutuksessa.

FHA0000643 Chemistry of Building Materials, 3 cr

The student is able to:

Opintojaksolla perehdytään niihin kemian yleisiin perusteisiin, kemian lakeihin ja reaktioihin, jotka ovat tarpeen rakennusainekemiassa. Tavoitteena on, että opiskelija ymmärtää kemiallisten ilmiöiden vaikutuksen erityisesti betonin, metallien ja eräiden orgaanisten materiaalien ominaisuuksiin ja käyttäytymiseen

FHA0000645 Basics of Construction Physics, 3 cr

The student is able to:

Tavoitteena on johdattaa opiskelija fysiikan perusteiden tuntemiseen sekä auttaa häntä huomaamaan fysiikan keskeinen merkitys tekniikassa. Opintojakson suoritettuaan opiskelija tuntee tärkeimmät mekaniikan perusilmiöt ja -lait: Newtonin lait, energian käsitteen, työ-energia vastaavuudet, nestefysiikan, lämpöopin ja ääniopin perusteita. Keskeinen tavoite on luonnonilmiöiden ymmärtämisen lisäksi niihin liittyvien lakien soveltamistaidon kehittäminen rakennusfysikaaliselta kannalta keskeisissä ilmiöissä.

FHA0000324 Safety at Work, 3 cr**The student is able to:**

Opiskelija tuntee työturvallisuutta säätelevät lait ja asetukset. Opiskelija osaa työskennellä harjoittelu- ja työyhteisössä ergonomisesti ja huomioiden alan työturvallisuusohjeet. Opiskelija tunnistaa omat voimavaransa ja huolehtii osaltaan omasta ja työyhteisön hyvinvoinnista. Opiskelija osaa antaa ensiapua onnettomuustilanteessa.

FHA0000644 Site Surveying, 4 cr**The student is able to:**

Kurssin tavoitteena on perehdyttää opiskelija rakentamissa tarpeellisiin mittaustekniikan peruskäsitteisiin. Kurssin suoritettuaan opiskelija tunnistaa keskeiset koordinaatistojärjestelmät, osaa laskea rakennusten ja infrarakenteiden merkintämittoja sekä ymmärtää kartoittamiseen liittyvät keskeiset mittaustyömenetelmät. Lisäksi kurssin suoritettuaan opiskelija osaa perusteet maastomittausvälineiden käytöstä korkojen mittaamisessa sekä mittapisteiden maastoon merkitsemisessä.

FHA0000646 Basics of Municipal Engineering, 3 cr**The student is able to:**

Opintojaksolla käsitellään kaavoitushierarkiaa ja kaavoituksen piirustusmerkintöjä, tie- ja katu-luokitusta, maaperän ja liikennemäärien vaikutusta kadun rakenteeseen, tien ja katujen kerroksien merkitystä, maamassojen tilavuuden muutosta eri rakennusvaiheissa ja niistä johtuvia kustannuksia, tiehen ja katuun liittyviä muita teknisiä rakenteita. Lisäksi perehdytään kunnallistekniikan mitoitus-perusteisiin, vesijohtojen ja viemäreiden sijoitteluun sekä niihin liittyviin teknisiin laitteisiin.

Opintojakson jälkeen opiskelija osaa lukea asemapiirroksia, määrittää asuntoalueen tilantarpeen sekä suunnitella pieniä asuinalueita huomioiden lain asettamat vaatimukset. Hän osaa tehdä asunto-alueelta kadun pituus- ja poikkileikkauksia halutuilta paaluilta sekä laskea kadunrakennuksen tarvi-kemenekin ja kustannukset katutyypistä ja maaperästä riippuen. Lisäksi hän osaa laskea vesi- ja jäte-vesihuollon putkistojen mitoitusperusteet ja piirtää viemäriinjakukset maastoon siten, että se on tek-nisesti ja taloudellisesti järkevää.

FHA0000647 Detached House Building, 3 cr**The student is able to:**

Opintojakson aikana opiskelija vertailee asuinkerrostalon rakenteiden ja tilojen muuttumista 1960-luvulta nykypäivään. Opintojakson jälkeen opiskelija pystyy selittämään kerrostalon ARK ja RAK- suunnitelmien sisällön. Opiskelijat tekevät yhteenvedon kerrostalon eri tiloista ja raportoivat aihealueensa keskeiset tekijät ryhmälle.

FHA0000648 Building of Multistorey Buildings, 3 cr**The student is able to:**

Opintojakson aikana opiskelija vertailee asuinkerrostalon rakenteiden ja tilojen muuttumista 1960-luvulta nykypäivään. Opintojakson jälkeen opiskelija pystyy selittämään kerrostalon ARK ja RAK- suunnitelmien sisällön. Opiskelijat tekevät yhteenvedon kerrostalon eri tiloista ja raportoivat aihealueensa keskeiset tekijät ryhmälle.

FHA0000649 Task and Weekly Work Planning, 8 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa laatia yksittäistä työkokonaisuutta koskevan työsuunnitelman

osaa suunnitelmalla varmistaa, että tehtävälle asetetut aika-, kustannus- ja laatutavoitteet saavutetaan

osaa pitää työvaiheen aloituspalaverin

osaa reagoida poikkeamiin ja tehdä tarvittavat korjaustoimenpiteet

osaa varmistaa viikkoaikataulun tehtävien toteuttamis- ja aloitusedellytykset osaa laatia resurssipohjaisen viikkoaikataulun

osaa sitouttaa työntekijät viikkoaikataulun tehtäviin

osaa valvoa viikkoaikataulun toteutumista ja tehdä tarvittavat ohjaustoimenpiteet

osaa kehittää itseään viikkoaikataulun suunnittelemisessa analysoimalla edellisten viikkojen toteutumattomien tehtävien syitä

FHA0000659 Building Renovation, 6 cr**The student is able to:**

Tavoite: Opiskelija perehtyy Suomessa eri aikakausina käytettyihin yleisimpiin rakenneratkaisuihin. Kustakin rakenneratkaisusta käydään läpi tyypilliset vauriomekanismit ja niihin sopivat korjaustavat. Erityistä huomiota kiinnitetään 60- ja 70-luvuilla rakennettujen betonielementtijulkisivujen vaurioihin ja korjausvaihtoehtoihin. Rakenteiden kantavuuden lisääminen ja työnaikaiset tuennat käsitellään tämän oppijakson yhteydessä.

Opintojakson aikana tehdään muutos- tai korjauskohteena olevan rakennuksen inventointi ja lähtökohtapiirustukset, joiden avulla selvitetään muutossuunnittelun mahdollisuudet ja rajoitukset.

Suunnittelussa opitaan huomioidaan erityisesti rakennusperinne ja rakennettu ympäristö.

Harjoitustöinä tehdään rakennusten kuntoarvioita ja korjaussuunnitelmia. Harjoitustöissä esitetään ratkaisuja kantavien rakenteiden muutoksiin.

Esiteidot: Rakennusfysiikka, Rakennetekniikka

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu talonrakennuksen suuntautumisvaihtoehdon pakollisiin ammattiopintoihin ja on esitietovaatimuksena opintojaksoon Korjausrakentamisen jatkokurssi.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, korjausrakentaminen

FHA0000660 Mechanics Advanced Course, 6 cr**The student is able to:**

Tavoite: Opintojaksolla käsitellään kimmoteorian mukainen vääntörasitusten laskenta sauva- ja laattarakenteissa ja laajennetaan elementtimenetelmä levy-, laatta- ja kuorirakenteiden laskentaan.

Esitiedot: Mekaniikka 2

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennetekniikan pääaineopintoihin.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, mekaniikka

FHA0000663 Applied Physics Advanced Course, 3 cr

FHA0000662 Building Renovation Advanced Course, 3 cr

FHA0000661 Structural Steel Design 1, 6 cr

The student is able to:

The course deals with the structural design of typical load-bearing steel structures. The dimensioning of structural members is done according to Eurocode 3. The selection of different steel sections, the structural behavior of different frame and bracing systems as well as the factors which may need to be considered in the design of industrial buildings. The practical design of steel structures of an industrial building (e.g. the frame, purlins and cladding) is studied in a design exercise (app. 3 cr).

Prerequisites: Basic Course in Steel Structures, Mechanics

Requirements: Examination, exercise works and design exercise.

FHA0000664 Timber Constructions, 6 cr

FHA0000665 Bridge Construction, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään siltahankkeen vaiheisiin yleissuunnittelusta rakentamisen suunnitteluun ja tutustutaan sillanrakennusta koskeviin määräyksiin ja ohjeisiin.

Esitiedot:

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, ammattiopinnot, sillanrakennus

FHA0000667 Soil Construction Advanced Course, 3 cr

The student is able to:

Tavoite: Jatkokurssilla käytyään opiskelija osaa valita ja suorittaa käytännössä oikeat pohjatutkimusmenetelmät ja laboratoriotutkimukset, joita tarvitaan rakennusmaan geoteknisessä suunnittelussa. Tutkimustuloksia oppilas osaa soveltaa perustamistavan valinnassa, arvioidessaan rakenteiden painumia sekä mitoittaessaan maanvaraisia tai maanpaineen alaisia rakenteita.

Esitiedot: Pohjarakennus

Yhteydet muihin opintoihin: Opintojakso on osa Yhdyskuntarakentaminen-kokonaisuutta

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, ammattiopinnot, pohjarakennus

FHA0000666 Project and Site Management, 15 cr

The student is able to:

Opintojakso suoritetaan työpaikkaopintoina yrityksen ja oppilaitoksen yhteyshenkilöiden ohjauksessa. Jakson aikana opiskelija perehtyy kohdeyrityksessä tai -työmaalla mm. rakennushankkeen aikataulusuunnitteluun, tehtäväsuunnitteluun ja kustannuslaskentaan. Opiskelija osallistuu työmaan johtamiseen vastaavan työnjohtajan apuna sekä perehtyy ohjatusti työmaainsinööriin tehtäviin.

FHA0000669 3D Modelling, 5 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennussuunnittelu -sivuaineeseen.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, rakennussuunnittelu, tuotemallinnus

FHA0000670 Cost Estimating, 4 cr

The student is able to:

Tavoite: Opintojakson suoritettuaan opiskelija osaa soveltaa investointilaskennan menetelmiä rakennus- ja kiinteistöalan elinkaarilaskennassa. Opiskelija tuntee talonrakennushankkeen urakkatarjous- ja rakentamisvaiheiden kustannuslaskennan menetelmät sekä perehtyy tuotemallipohjaiseen määrätietojen hallintaan, panospohjaisten tuotantorakenteiden käyttöön kustannusarviolaskennassa ja tuotannon suunnittelussa. Esitiedot: Rakentamistalous
Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennushankkeen ohjaus -sivuaineeseen.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, kustannuslaskenta

FHA0000668 Procurement, 3 cr

The student is able to:

Tavoite: Opintojakson tavoitteena on antaa yleiskuva hankintatoimesta rakennusyrityksen tuotannon ohjauksen osana. Opintojaksolla perehdytään hankkeen tarjous- ja yleissuunnitteluvaiheen hankintojen suunnitteluun, aliurakoiden hankintaan sekä materiaalihankintojen sopimus- ja ohjausprosesseihin.

Esitiedot: Rakentamistalous, tuotannonohjaus

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennushankkeen ohjaus -sivuaineeseen.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, hankintatoimi

FHA0000676 Municipal Engineering Seminar, 3 cr

The student is able to:

Tavoite: Opiskelija valitsee seminaarin aiheen yhdyskuntatekniikan alueelta. Seminaariin kuuluu esitelmä ja kirjallinen tuotos, joiden perusteella arvostelu tapahtuu.

Esitiedot: -

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, ammattiopinnot, yhdyskuntarakentaminen

FHA0000677 Noise Control, 3 cr

The student is able to:

Tavoite:

FHA0000678 Environmental Impacts Assessment in Infra Projects, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee käsitteet melu ja ympäristömelu. Opiskelija ymmärtää ympäristömelun erilaiset päästölähteet ja niiden merkityksen sekä mahdollisuudet meluntorjuntaan.

Esitiedot: 17022400 Ympäristötekniikan perusteet, 20483413 Meluntorjunta, 20481671 Ympäristölait ja -hallinto

Yhteydet muihin opintojaksoihin: -

FHA0000680 Concrete Structure Design, 6 cr

The student is able to:

Tavoitteet:

Opintojakso keskittyy teräsbetonirakenteiden suunnitteluun EC2:n mukaan. Opiskelija osaa laatia yleisimmistä teräsbetonirakenteista rakennemallin, osaa suunnitella paikallavalettuja- ja elementtirakenteita sekä niiden liitoksia, osaa selittää betonirungon jäykistysperiaatteet. Kurssin harjoitustyönä opiskelija laatii rakennesuunnitelmia elementtirakenteisesta hallista, asuin- ja toimistorakennuksesta. Esitiedot: Betonirakentaminen, betoniteknologia, rakennetekniikan perusteet

FHA0000679 Mechanics 2, 6 cr

FHA0000274 Professional communication, 3 cr

The student is able to:

Opiskelija osaa

toimia tavoitteellisesti neuvottelussa, palaverissa ja muissa asiantuntijuutta vaativissa viestintä-, vuorovaikutus- ja päätöksentekotilanteissa sekä kasvokkain että verkossa
toimia asiallisesti esimiesviestintätilanteissa
tarkastella esimiesviestintätaitoja ja niiden vaikutuksia organisaatiossa
hyödyntää ja kehittää tiedonhallintataitojaan.

FHA0000681 Building Physics, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

muistaa, missä rakennusmääräyksissä käsitellään ja annetaan vaatimuksia rakenteiden ja tilojen rakennusfysikaaliselle toiminnalle

ymmärtää seuraavat rakennusfysikaaliset ilmiöt ja termit: rakennusten painesuhteet ja niiden muodostumisen, lämpöfysiikan ilmiöt, säteily, konvektio, johtuminen, sääilmiöt ja rakenteiden kosteuslähteet, kosteusfysiikan perusilmiöt, ilman kosteuden ja lämpötilan muutokset ja niiden riippuvuudet (suhteellinen kosteus, absoluuttinen kosteus, kyllästyskosteus, kosteuslisä, kastepistelämpötila), materiaalien kriittiset kosteuspitoisuudet, kosteuskäyttäytymisen, homehtumisriskit rakenteissa, erityyppisten rakenteiden normaalit kosteuspitoisuudet eri vuodenaikoina

osaa laskea yksinkertaisen rakenteen U-arvon sekä rakenteen lämpöjakauman

osaa tilata tai suositella soveltuvien eri rakennusfysikaalisia mittauksia kuten kosteusmittauksia, tiiviysmittausta ja lämpökuvausta

FHA0000682 Basic Course in Steel Structures, 3 cr

The student is able to:

The objective of the course is to introduce the student to the present-day use of steel in civil engineering applications, and gain the important background information necessary for an understanding of practical design requirements. The basic characteristics of steel material and important mechanical properties of steel relevant to their performance in load-bearing structures are discussed during the course. Typical steel products, structural members and constructions are outlined. The basic concepts of limit state design, the elastic and plastic behaviour of steel beams and stability are considered.

Prerequisites: Mechanics

Requirements: Examination and coursework/ a brief literature survey.

FHA0000683 Realisation Plans, 3 cr

The student is able to:

Tavoite: Opintojaksolla käsitellään rakennuksen toteuttamisessa tarvittavat rakennustekniset suunnitelmat ja selostukset. Opitaan valitsemaan uudis- ja peruskorjauskohteisiin tarvittavat, täydentävät rakennusosat kuten ikkunat, ovet, kalusteet, laitteet ja varusteet. Käsitellään portaat, kaiteet, tulisijat yms. ja selvitetään niitä koskevat turvallisuus- ja rakentamismääräykset. Selvitetään erilaisten pintarakenteiden valintaperusteet sekä laaditaan niistä suunnitelmat ja työselostukset.

Esitiedot: Tekninen dokumentointi

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu Rakennussuunnittelun sivuaineopintoihin.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, toteutussuunnittelu

FHA0000684 Renovation, 6 cr

The student is able to:

Opintojakson päätyttyä opiskelija tuntee eri aikakausien tyypillisten rakennusten runko- ja julkisivuvaihtoehdot sekä niiden tavallisimmat vauriot ja niille sopivat edullisimmat korjaustavat.

Opiskelija tuntee useita menetelmiä eri materiaaleista tehtyjen runkorakenteiden kantavuuden parantamiseksi ja hänellä on käsitys rakennuksien painuvien perustuksien erilaisista korjaustavoista.

Opiskelija on hyvät valmiudet suunnitella ja toteuttaa parvekkeiden eri asteisia korjauksia sekä julkisivujen korjauksia ja lisäeristämisiä.

FHA0000685 Building Contracting, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee rakennushankkeen vaiheet ja näihin liittyvät rakennuttamistehtävät, hallitsee sopimustekniikkaa ja osaa soveltaa tietojaan osapuolten välisessä yhteydenpidossa.

Opiskelija osaa laatia hankesuunnitelman ja valmistella tarjouspyyntö- ja sopimusasiakirjoja sekä laatia hankkeen tavoitehintalaskelman ja rakennusosa-arvion. Hän tuntee suunnittelu- ja rakentamismäärien ohjauksen periaatteet ja omaa valmiuksia toimia rakennuttajan apuna kokous-, valvonta- ja tarkastustehtävissä

FHA0000686 Site Planning, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija sisäistää työmaasuunnittelun merkityksen osana rakentamisen laadullista ja taloudellista lopputulosta. Opiskelija soveltaa opintojaksolla oppimaansa ja suunnittelee työmaan toteutukseen liittyviä keskeisiä tehtäviä

FHA0000687 Building Contracts, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee rakennushankkeen eri vaiheiden sopimustekniikkaa ja -muotoja. Opiskelija osaa keskustella ja ratkaista sopimuksiin liittyviä tehtäviä.

FHA0000689 Procurement and Logistics, 3 cr**The student is able to:**

Opintojakson suoritettuaan opiskelija ymmärtää hankintojen merkityksen rakennushankkeessa, tuntee hankintatoimen käytännöt, tilaus- ja sopimushankinnat, pientehostukset, toimitusten suunnittelun ja varastoinnin sekä hankintoihin liittyvän lainsäädännön ja säädökset, hankintasopimukseen liittyvät sopimusehdot (esim. RYHT, KSE).

Opiskelija osaa laatia yksittäisiä materiaalitilauksisopimuksia, yksiselitteisiä alihankintasopimuksia ja ottaa huomioon em. sopimuksissa työmaan ohjauksen, tehtäväsuunnitelman ja yleisten sopimusehtojen oleelliset vaatimukset.

Opiskelija hallitsee alihankintojen ja materiaalihankintojen ohjauksen, osaa laatia työryhmän määräaikaista työsopimuksia sekä em. sopimuksia soveltaessa luoda edellytykset työn onnistuneelle toteutukselle ja ohjaukselle. Lisäksi opiskelija ymmärtää logistiikan merkityksen rakennushankkeessa sekä hallitsee työmaan tulo-, sisä- ja lähtölogistiikan.

FHA0000688 Production Management and Quality Assurance, 3 cr**The student is able to:**

Opintojakson suoritettuaan opiskelija osaa valita työkohteeseen sopivan aikataulumuodon, laatia työmaan ohjaukseen soveltuvan aikataulun, varmistaa aikataulun toteuttamis- ja ohjaukselliset tehtävät sekä toimeenpanna ja valvoa aikataulun toteutumista.

Opiskelija osaa vinoviiva aikataulutekniikan käytön (paikka-aikakaavio), osaa laatia vinjetin ja vinjettivalvonnan sekä käyttää RATU -tiedostoja (aikataulukirja, menekkitiedostot).

Lisäksi opiskelija osaa suunnitella projektikohtaiset laadunvarmistustoimenpiteet sekä koko hanketta että yksittäistä tehtävää koskien, varmistaa, että laadunvarmistustoimenpiteet ovat käytännönläheiset ja yksiselitteiset ja osaa toimeenpanna laadunvarmistustoimenpiteet. Opiskelija osaa välittää laatuvaatimukset työn toteuttajille

FHA0000690 Land Use Planning, 3 cr**The student is able to:**

Tavoite: Opintojaksolla perehdytään kaavajärjestelmään, sen perustana olevaan lainsäädäntöön ja kaavoituksen liittymiseen muuhun yhteiskuntasuunnitteluun. Opiskelija osaa lukea kaavoja, ottaa huomioon erilaisten toimintojen, maaston, kunnallistekniikan ja toteuttamiskustannusten asettamat vaatimukset sekä arvioida ympäristövaikutuksia ja kustannusten muodostumista. Opiskelija tuntee yhdyskuntarakenteen osatekijät ja niiden vaikutuksen yhdyskuntatalouteen. Opiskelija omaksuu kestävän kehityksen periaatteet yhdyskuntasuunnittelussa ja kaavoituksessa.

Esitiedot: 09418300 Yhdyskuntatekniikka

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu yhdyskuntatekniikan suuntautumisvaihtoehdon pakollisiin ammattiopintoihin.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, ammattiopinnot, kaavoitus

FHA0000691 Construction and maintenance of traffic routes, 6 cr**FHA0000692 Management and Leadership, 3 cr****The student is able to:**

Opintojakson suoritettuaan opiskelija ymmärtää, mitkä tekijät vaikuttavat keskeisesti työmotivaatioon ja työhyvinvointiin. Opiskelija tunnistaa yksilöllisyyden merkityksen esimies- ja alaistyössä sekä osaa käyttää työehtosopimuksia ja ratkaista ongelmatilanteita niiden pohjalta. Opiskelija osaa toteuttaa johtamisen tehtäviä ja käyttää johtamisen välineitä rakennustyömaalla.

FHA0000693 Task and Weekly Work Planning, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa laatia yksittäistä työkokonaisuutta koskevan työsuunnitelman sekä suunnitelmalla varmistaa, että tehtävälle asetetut aika-, kustannus- ja laatutavoitteet saavutetaan. Opiskelija osaa pitää työvaiheen aloituspalaverin, reagoida poikkeamiin ja tehdä tarvittavat korjaustoimenpiteet. Lisäksi opiskelija osaa varmistaa viikkoaikataulun tehtävien toteuttamis- ja aloitusedellytykset, laatia resurssipohjaisen viikkoaikataulun sekä sitouttaa työntekijät viikkoaikataulun tehtäviin. Opiskelija osaa valvoa viikkoaikataulun toteutumista, tehdä tarvittavat ohjaustoimenpiteet ja kehittää itseään viikkoaikataulun suunnittelemisessa analysoimalla edellisten viikkojen toteutumattomien tehtävien syitä.

FHA0000694 Production Management, 15 cr

The student is able to:

Opintojakso suoritetaan työpaikkaopintoina yrityksen ja oppilaitoksen yhteyshenkilöiden ohjauksessa. Jakson aikana opiskelija perehtyy kohdeyrityksessä tai -työmaalla mm. määrälaskentaan, rakennusliikkeen hankintatehtäviin, työmaan turvallisuustehtäviin ja suorittaa työmaalla avustavan työnjohtajan tehtäviä.

FHA0000695 Climate Change and Infrastructures, 3 cr

The student is able to:

Tavoite:

FHA0000697 Environmental Geology, 3 cr

The student is able to:

The student recognizes the main resources of soil and bedrock, the utilization of these resources and the environmental impacts of utilization. The student knows the basics of soil and mineral resources, ground water and geothermal energy.

FHA0000698 Earthworks, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään maarakennuskoneiden ja kuljetuskaluston työskentelytapoihin ja kalustovalintaan sisältäen erilaiset käsitteet ja kalustonvalintaan liittyvät asiat.

Esitiedot: Geotekniikka

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, ammattiopinnot, maarakennustyöt

FHA0000700 Project Activities, 3 cr

The student is able to:

Opiskelija osaa määritellä pientalohankkeessa rakennuttajan, pääsuunnittelijan ja vastaavan työnjohtajan tehtävät ja laatia pientalohankkeen hankeaikataulun. Hän osaa hakea vastaukset urakkasopimuksen sisältöä koskeviin kysymyksiin Rakennusurakan yleisistä sopimusehdoista (YSE). Opiskelija osaa mitoittaa asunrakennushankkeen yleisaikataulun tehtävänimikkeiden kestot RATU tuotantotietoja apuna käyttäen.

FHA0000699 Concrete Constructions, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa listata betonin valmistuksen osa-aineet ja niiden tärkeimmät ominaisuudet

tuntee betonin ja betonirakenteiden valmistustekniikan päävaiheet

kuvailee betonimassan ja kovettuneen betonin tärkeimmät ominaisuudet sekä menetelmät, joilla niitä säädellään

tuntee betonirakentamisen laadunhallinnan keskeiset menetelmät

kuvailee betonin vaurioitumismekanismit

määrittelee käyttöikäsuunnittelun keskeiset muuttujat

FHA0000701 Housing and Office Building, 6 cr

The student is able to:

Asuinrakentamisen osuuden suoritettuaan opiskelija osaa määritellä asuinrakentamisen perusrakenteet, tuntee määräykset ja yleisimmät materiaalit. Opiskelija osaa vertailla asuinkerrostalojen rakenteiden kehittymisen muutoksia ja ratkaista harjoituksissa eri vaihtoehtoja määräystenmukaisten lämpö-, kosteus-, ja paloteknisten ominaisuuksien saavuttamiseksi.

Liikerakentamisen osuuden suoritettuaan opiskelija osaa kuvailla teräsbetoni-, teräs- tai puurunkoisen teollisuus- ja liikerakennuksen vaihtoehtoiset runkorakenteet ja niiden keskeisen toimintaperiaatteen. Opiskelija osaa määrittellä väestönsuojan rakentamistarpeen ja väestönsuojalta vaadittavat ominaisuudet sekä tulkitsee palo- ja ääneneristysmääräyksiä ja -ohjeita sekä osaa soveltaa niitä eri rakennusratkaisuja valitessaan.

FHA0000702 Basics of Strength Theory, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

tuntee lujuusopin tärkeimmät peruskäsitteet

hahmottaa kiinteiden kappaleiden mekaanisen käyttäytymistavan veto-, puristus-, leikkaus- ja taivutusrasituksen alaisena

laskee perustapausten, kuten veto- ja puristussauvojen ja suorien palkkien, jännitykset ja siirtymät

mitoittaa staattisesti kuormitetun yksinkertaisen rakenteen sallittujen jännitysten menetelmällä

SISÄLTÖ:

Jännitys- ja venymäkäsité, Hooken laki, normaalijännitys, leikkausjännitys, taivutusjännitys, poikkipinnan geometriset suureet, pääjännitykset, jännitystila

FHA0000703 Basics of Structural Engineering, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

tuntee normiohjauksen ja rakenteiden suunnittelun perusperiaatteet

määrittää rakenteisiin kohdistuvat tyypillisimmät kuormat

suunnittelee omakoti- ja rivitalon yksinkertaiset kantavat puurakenteet

SISÄLTÖ:

Rakentamisen normiohjaus, suunnittelijan pätevyys, rakenteiden kuormat ja kuormitusyhdistelmät, rajatilamitoitus.

FHA0000706 Concrete Technology, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

luokittelee raudoitetut betonielementit teräsbetoni- ja jännebetonituotteisiin

tuntee yleisimmät Suomessa käytettävät betonielementtityypit, niiden valmistustekniikat, toimintatavat ja käyttökohteet

tuntee harkkorakenteiden yleisimmät käyttökohteet ja -tavat

kuvailee betonipalkin kuormituskokeen vaiheet ja hahmottaa raudoituksen merkityksen palkin käyttäytymiseen

SISÄLTÖ:

Elementtituotteet eli palkit, pilarit, laatat, seinät, harkkorakenteet, betonielementtitehtaan toiminta, betonielementtien valmistus, betonielementtien käyttö

FHA0000705 Building Design 1, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa suunnitella omakotitalon annetun ohjelman mukaan, rakennuspaikan määräykset ja olosuhteet huomioon ottaen.

FHA0000636 HPAC-systems of Buildings, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelijalla on kokonaiskäsitelmä rakennusten lämmitys-, vesi- ja ilmanvaihtojärjestelmistä sekä terveellisestä sisäilmastosta. Hän osaa tulkita rakennuksilla esiintyviä LVI-järjestelmien piirustuksia sekä tietää yleisellä tasolla lvi-järjestelmiä koskevat määräykset ja ohjeet. Hän ymmärtää ja osaa otetaan huomioon rakennusten teknisten järjestelmien sekä niiden käytön ja ylläpidon merkityksen energian kulutuksessa ja energiakustannuksissa.

FHA0000707 Basics of Concrete Structure Design, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

tuntee suunnittelun kannalta keskeiset betonin ja betoniteräksen materiaaliominaisuudet

tuntee teräksen ja betonin yhteistoiminnan merkityksen teräsbetonirakenteessa

suorittaa tavanomaiselle taivutetulle teräsbetonirakenteelle murtorajatilamitoituksen

suunnittelee omakoti- ja rivitalon yksinkertaiset kantavat teräsbetonirakenteet

Sisältö:

Teräsbetonirakenteiden rajatilamitoitus.

FHA0000708 Applied Mathematics, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa

- muodostaa ristikko- ja kehärakenteen elementtimenetelmäpohjaisen laskentamallin
- ekvivalenttien solmukuormitusten määrittämisen perusteet
- elementtimenetelmäohjelmiston käytön perusteet rakenteiden mekaniikassa
- soveltaa elementtimenetelmälaskentaa ristikko- ja kehärakenteen mitoittamiseen staattisen kuormituksen tapauksessa
- arvioida elementtimenetelmällä laskettuja tuloksia

FHA0000709 Building Production, 3 cr

The student is able to:

Opintojaksolla opiskelija perehtyy talonrakennustyömaiden keskeisiin piirteisiin. Opintojakson suoritettuaan opiskelija osaa valita eri rakentamisvaiheisiin tyypillisesti kuuluvat työmenetelmät erityisesti työsisällön, -koneiden, turvallisuuden ja laadun kannalta. Opiskelija osaa käyttää omaksumaansa tietoa ratkaistakseen opintojaksoon kuuluvia tehtäviä.

FHA0000710 Land Surveying Advanced Course, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija hallitsee maastomittauksessa käytettävien keskeisten mittausvälineiden, kuten takymetrin ja vaaituskojeen, käytön sekä hallitsee Suomessa yleisesti käytössä olevien mittausteknisten ohjelmistojen periaatteet ja mahdollisuudet. Opintojaksolla opiskelija oppii soveltamaan käytäntöön aikaisemmissa opinnoissa opittuja teorioita.

FHA0000713 Road and Street Planning, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa piirtää annetulle karttapohjalle tie- tai katulinjan suomalaisten mitoitusohjeiden mukaisesti. Opiskelija tunnistaa eri piirustuslajien, kuten vaakageometrian, pystygeometrian ja poikkileikkausten, väliset riippuvuussuhteet. Opintojakso harjaannuttaa opiskelijaa lukemaan suunnitelmia käytännön tilanteissa sekä antaa valmiudet ATK-pohjaisten suunnitelmien laadintaan.

FHA0000712 Applied Data Processing, 3 cr

The student is able to:

The student recognizes the working process of municipal engineering planning. The student can start a project, take the information in the database and form a terrain model. The student can also make municipal engineering design using CAD-based software.

FHA0000714 Water Supply Technology, 3 cr

The student is able to:

Opiskelija tuntee yhdyskuntien vesihuollon kokonaisuuden, joka koostuu vedenhankinnan ja viemäroinnin verkostoista ja laitoksista. Hän pystyy mitoittamaan käsittelylaitosten prosessiyksiköt ja laatimaan yleissuunnitelmat. Vedenjakelu- ja viemäriverkostojen osalta opiskelija osaa laatia suunnitelmat ja arvioida painejärjestelmien virtaustiloja. Myös rakentamisen käytäntöjä tutkitaan.

FHA0000715 Chemistry, 3 cr

The student is able to:

Opintojakson aikana käsitellään kemian keskeisimmät käsitteet sekä perusreaktiot ja -laskut. Opittua sovelletaan esimerkiksi betonin, metallien, muovien tarkastelussa. Tavoitteena on, että opiskelija ymmärtää kemian merkitystä sekä materiaalien että elinympäristön kannalta.

Opintojakson jälkeen opiskelija osaa käyttää jaksollista järjestelmää, suolojen liukoisuustuloja, happo- ja emäsvakioita sekä normaalipotentiaaleja. Lisäksi opiskelija osaa laatia kemiallisia reaktioyhtälöitä ja hyödyntää niitä ainemäärä-, savukaasu- sekä pH- ja neutralointilaskuissa. Opiskelija osaa myös nimetä hiilivetyjä, alkoholeja, aldehydejä ja karboksyylihappoja ja antaa esimerkkejä niiden tyypillisimmistä reaktioista.

FHA0000717 Mechanics, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija:

ymmärtää jäykän kappaleen tasapainon idean ja osaa laskea kappaleeseen vaikuttavat voimat tasapainoyhtälöillä

osaa laskea staattisesti määrätyn palkin tukireaktiot

osaa määrittää palkin sisäiset voimasuureet (leikkausvoima Q , taivutusmomentti M , normaalivoima N)

ymmärtää voimasuureiden yhteyden jännityksiin (leikkaus-, taivutusveto- ja aksiaalinen jännitys)

osaa piirtää rasituskuviot (leikkausvoima-, taivutusmomenttikuviot)

osaa laskea palkkisysteemien ja staattisesti määrättyjen kehien voimasuureet ja piirtää rasituskuviot

osaa laskea ristikon sauvavoimat nivelpisteiden tasapainoyhtälöillä sekä tarkistaa yksittäisiä sauvavoimia leikkausmenetelmällä

osaa laskea poikkileikkauksen geometriset suureet: painopiste, hitausmomentti sekä taivutusvastus

FHA0000716 Detached House Building, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

muistaa mistä etsitään rakennusalan ammatillista tietoa: rakennusmääräykset, RT-kortit jne.

muistaa rakennusalan yleisimmät perustermit ja käsitteet sekä piirustusmerkinnät.

muistaa yleisimmät rakennusmateriaalit ja niiden perusominaisuudet.

ymmärtää seuraavat rakenteiden toimintaan liittyvät perusasiat: kuormitusten muodostumisen, pientalojen runkovaihtoehdot ja niiden ominaisuudet, perustusvaihtoehdot, lämmöneristyksen merkityksen, tuulensuojauksen merkityksen, vesieristeiden ja höyrynsulun merkityksen

tuntee kiinteistökohtaiset jätevesijärjestelmät.

ymmärtää rakennushankkeen lupakäytännöt ja toimintamallit.

muistaa rakennushankkeen vastuuhenkilöiden perustehtävät.

FHA0000718 Basics of Surveying, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija:

- osaa määrittää koordinaatit suomalaisista koordinaattijärjestelmistä YKJ, KKJ ja Euref-FIN
- osaa keskeiset laskentatavat säteittäisen mittauksen ja suorakulmaisen mittauksen tuloksista
- osaa luoda maastomallin, korkeuskäyrät ja keskeiset editointitavat 3D-mittausohjelmistolla
- osaa vaaita vaaituskojeella ja latalla
- osaa takymetrin käytön alkeet

Sisältö: koordinaattijärjestelmät, 3 D win -ohjelmisto, geodeettiset, säteittäiset ja suorakulmaiset laskelmat

FHA0000650 Geotechnics, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija:

- tunnistaa jääkauden vaikutuksen suomalaiseen maaperään
- osaa nimetä maalajit rakeisuuden perusteella
- osaa maan luokitusominaisuudet ja tekijät, joilla saavutetaan rakennettavuudeltaan hyväksyttävät perustamisolot
- osaa tulkita ja piirtää keskeisiä pohjatutkimusdiagrammeja
- osaa määrittää lujuusparametrit pohjatutkimustulosten perusteella
- osaa mitoittaa seinänturan kantokestävyyden ja kellarin seiniin vaikuttavan maanpaineen

Sisältö: jääkausi, maalajin luokitusominaisuudet, pohjatutkimukset, maaperän tekniset ominaisuudet

FHA0000720 Basic Course in Steel Structures, 3 cr

The student is able to:

OBJECTIVES

After the course the students

- Understand the basics of production of steel,
- Can apply the basics of material properties of steel,
- Can use and find information regarding to steel products.
- Can design laterally restrained beams at cross section classes 1-3,
- Can design axially loaded columns at cross section classes 1-3,
- Are able to recognize typical joints in steel structure
- Can design simple bolted connection.
- Are aware of corrosion protection of steel structures.
- Are aware of fire protection of steel structures.
- Can describe basics of steel construction manufacturing and erection methods
- Are able to use Eurocode 1993-1-1.

CONTENT

Production of steel, properties of steel (stress - strain relationship), steel products for building applications, Design of members under tension, design of restrained beams, design of axially loaded columns, design of bolted connection, preventing corrosion.

FHA0000738 R&D Assignment, 5 cr

The student is able to:

Research and development assignment (R&

FHA0000735 Manufacturing and Execution of Steel Constructions, 6 cr

The student is able to:

The objective of the course is to introduce the present-day manufacturing and execution methods in civil engineering applications related to steel structures, and gain the important background information necessary for an understanding of practical aspect to be taken into account within steel structure designing project. Workshop process, basics of welding and corrosion protection, fire protection methods, detailed drawings for manufacturing, implementation of the steel structure project, quality control and checking are main topics of the course. In addition, the erection methods of steel structures are discussed.

FHA0000737 Design Assignment, 5 cr

The Design Assignment is a practical design work done as a project related to steel structures. It may include use of standards, computer programs, generating drawings and other typical engineering tasks included to design process of steel structures. The assignment likely concerns the topics of current practical interest in design or fabrication of steel structures. It can be completed in collaboration with the industry.

The objective of this course is to introduce alternative and more ecological technology of managing urine, faeces and different types of wastewaters born in households. The word ‘

Asiasanat:

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FHA0000742 Environmental and Quality Management Systems, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000743 Environmental and Safety Risks, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000744 Environmental Economics, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000745 Research and development skills, 3 cr

The student is able to:

The course aims at helping the students to deepen their knowledge of research and development in their own field and prepare them for writing their thesis.

The students can apply an analytical, investigative and reflective working method in order to develop their professional skills. The student is familiar with the thesis process. Based on these competences the student can write a description of the thesis topic.

The student masters research and development methods as well as the most common forms of oral, written or visual presentations and reports needed for research and development in their field. Based on these competences the student is able to write a thesis plan.

FHA0000749 Building Services, HVAC and Plumbing, 6 cr

The student is able to:

The objective of the course is to introduce the student to the heating, water supply, sewerage and air-conditioning systems of a building. As coursework students draw up the HVAC tender documents for a specific building, in accordance with the Finnish regulations.

Degree requirements: Coursework and examination.

FHA0000747 Structural Engineering 2, 6 cr

The student is able to:

The objective of this course is to provide the student with a wider knowledge and understanding of structural engineering. The course includes seminars, coursework, excursions and laboratory work. Coursework comprises the designs for high-rise buildings with both in-situ and prefabricated structures. In the design work, the students familiarise themselves with the use of computer-aided design programmes. The course also gives an insight into the building Euro-codes. Some of the studies can be replaced by courses from the International Semester programme.

Prerequisites: Compulsory professional studies in building technology

Degree requirements: Coursework and examination.

FHA0000746 Building Physics, 3 cr

The student is able to:

This course is designed to develop the understanding of physical science related to professional, line-specific studies. The content of the course includes heat transfer, moisture in structures, sound insulation, air quality, properties of water and soil pressure, and radon emission.

Prerequisites: Physics 1, Physics 2

Degree requirements: Coursework, laboratory work and examination.

FHA0000748 Renovation, 6 cr

The student is able to:

This course is designed to introduce the student to topics related to existing buildings, such as town planning, historical buildings and landscape related values, and real estate assessment and maintenance. On completion of the course, the student will be familiar with traditional building materials and methods. As coursework the students draw up condition assessment and renovation plans for a building

Degree requirements: Coursework and examination.

FHA0000750 Management and Leadership, Managing Across Cultures, 5 cr

The student is able to:

This module will consist of three integral parts:

Financial and Management Accounting 3 cr

The first objective of course is designed to introduce students to the fundamental principles of business finance with particular emphasis on the profit and loss account and the balance sheet with an introduction to the techniques used to read and interpret these statements including ratio analysis.

The second objective of this course is to introduce and demonstrate the principles of management accounting and show how each technique (such as investment Benefit-Cost analysis, Net Present Value, Internal Rate of Return) can be applied to the manager's day-to-day work as well as frame of reference for thesis.

Strategy Management 3 cr

This part of the module is built around the process of strategic management - the essential strategic decisions that organisations must take when creating and implementing strategies. Seven key themes which make up the crucial determinants for strategic success through to the millennium are introduced on the course. These are: adding value, core competencies and strategic capabilities, architecture and synergy, competitive advantage, strategic regeneration and strategy focused organization including Balanced Score Card approach for implementation of the strategy.

Managing Across Cultures 2 cr

This part of the module is planned to develop students understanding of how culture influences management practice and how managers perceive their organizations and their careers. It raises awareness of how culture guides the way managers look at problems, the solutions they find, the way they deal with others, and how others may react. The following issues will be covered: the undertow of culture, exploring culture, interacting spheres of culture, culture and management practice, multicultural team, global organization and business ethics.

FHA0000751 Structural Steel Design 2, 6 cr

The student is able to:

The purpose of the course is to provide the student with the basic understanding of several important areas of structural steel design. The following topics are included in the course: Bolted and welded connections, local buckling of plated structures, thin-walled cold-formed profiles, structural steel design for fire safety and steel-concrete composite structures. Practical design exercises and an accomplishment of a loading test of a cold-formed steel structure are included in the course.

Prerequisites: Structural Steel Design I

Requirements: Examination and exercise works.

FHA0000754 3D Structural Design, 4 cr

The student is able to:

After this course student can use basic tools of Tekla Structures software. Student is able to create a model and make production- and layout drawings from that model.

FHA0000752 Environmental Geology, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000753 Life Cycle Assessment and Product Ecodesign, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000755 Microbiology, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000756 Environmental Legislation 1, 3 cr

The student is able to:

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0000757 Basics of Enterprises Resource Planning Systems - SAP, 4 cr

The student is able to:

Opiskelija ymmärtää organisaation sisäisen tehokkaan ja järjestelmäperusteisen tiedonhallinnan perusteet. Kurssin käytännön harjoitusten kautta opiskelija hahmottaa SAP ERP (6.0) -järjestelmän perusrakenteen ja moduulien välisen integraation.

FHA0000762 Basics of Environmental Engineering, 3 cr

The student is able to:

The objective of this course is to learn the basic skills of the main fields of Environmental Engineering. These fields are energy and environment, air quality management, waste management and water management. Students will also be familiar with small calculations.

FHA0000758 Chemistry, 3 cr

FHA0000759 Site Surveying, 3 cr

The student is able to:

This course is designed to introduce the student to the principles of surveying. After the course student has a general view of various maps, he knows different surveying methods and can use equipment. Student has basic knowledge of the most modern surveying instruments and related application software

FHA0000760 Mechanics, 3 cr

The student is able to:

Having completed the course student understands basic principles of structural behaviour. He/she is able to solve numerical problems concerning statically determinate structures. The main topics in the course includes basics of statics: equilibrium of structures (e.g. beams, frames, trusses) deals with solving external load system on a structure, and determination of internal forces and moments (bending moment and shear force diagrams respectively) precedes the strength of materials issues (which are contents of the following course). Also cross-sectional properties of profiles are included in this course: centroid of a section, moment of inertia and section modulus.

FHA0000761 Building Construction, 3 cr

The student is able to:

Objectives:

After the course the students

- Are able to read and understand basic information from the permit drawings.
- Are able to find information related to building legislation (regulations and instructions)
- Can list the basic phases of building process.
- Have a basic understanding of typical single family house frame solutions and building materials (concrete, timber, brick, steel).
- Can separate building into specific elements (foundations, floor, walls, roof etc.)
- Can describe key issues affecting to the foundation design.
- Can describe main principles of thermal and moisture behaviour of key structural elements, such as floors, walls and roofs.
- Can separate load bearing structure out of typical single family house.
- Understand the fire protection methods used in typical single family houses.
- Can find additional information in the field of building construction.

Content:

Permit drawings, The National Building Code of Finland, foundations, floor, wall and roof structures, Basics of thermal and moisture behaviour, House frames, fire protection, house planning.

FHA0000763 Ecology, 3 cr

The student is able to:

The student can specify the principles of protection of species and regional nature conservation. The student can explain the demands of protected areas and can assess the signification of them to society.

FHA0000764 Geology, 3 cr

The student is able to:

This course is designed to introduce the student to the basics of geology and hydrogeology in Finland. After the course the student can identify different soils and perform basic geotechnical laboratory test. Student also knows the characteristics of Finnish bedrock and how to make use of groundwater as a part of water supply.

FHA0000766 Reporting in English, 3 cr

FHA0000767 Municipal Engineering, 3 cr

FHA0000769 Strength of Materials, 3 cr

The student is able to:

OBJECTIVES

After the course the students

- Knows basics of strength of materials
- Can describe material behaviour under various loadings.
- Can calculate stresses and deformations of simple solid structures under tension, compression and shear forces and bending moment.
- Can design statically determined simple structure using allowable stress method.

CONTENT

Stress - strain relationship, Hooke's law, normal, shear and bending stresses. Geometrical parameters of cross section, principal stresses, yield condition.

FHA0000771 Work Placement, 30 cr

The student is able to:

Harjoittelun suoritettuaan opiskelija

- on perehtynyt työelämään ammattialansa näkökulmasta
- osaa soveltaa oman opiskelualansa teoriaa työelämän käytäntöihin
- on harjaantunut jatkuvaan itseään ja omaa ammattialaansa kehittävään työskentelyyn ja yrittäjyyteen
- työllistyy opintojensa päättyessä
- voi sijoittua kansainvälisiin alansa tehtäviin

FHA0000774 Building Construction 2, 3 cr**The student is able to:**

This course provides an understanding of the practice of the Building Construction. It builds upon the fundamental skills developed in Mechanics and Structural Engineering and presents the principles of construction methods and construction technology. The course provides a perspective for dealing with the issues of Building Process, Foundations, Building Materials , Framing, Structures, Thermal, Acoustical and Moisture Protection and Fire Engineering.

The student learns the architectural design of a two-storey concrete block residential house:

- permit drawings
- implementation drawings
- master document

FHA0000775 Working Finnish, 6 cr**The student is able to:**

Learning outcomes: The student will achieve a first stage of basic proficiency level of Finnish that allows him/her to adequately manage in daily situations. S/he has knowledge of Finnish working life and culture as well as the basic skills to operate in his/her own field of work. The target language level for language proficiency is A2.1 of the Common European Framework of Reference for language learning.

FHA0000777 Geology, 3 cr**The student is able to:**

This course is designed to introduce the student to the basics of geology and hydrogeology in Finland. After the course the student can identify different soils and perform basic geotechnical laboratory test. Student also knows the characteristics of Finnish bedrock and how to make use of groundwater as a part of water supply.

FHA0000778 Waste Management Systems, 3 cr**The student is able to:**

The main parts of municipal waste management system will be learnt. The roll of waste prevention, waste recycling, biological and thermal treatment and landfilling will be known. Students will also understand what kind of influence both national and EU legislation has in building up waste management systems.

Prerequisites: Basics of Environmental Engineering , Municipal Engineering, Geotechnical Engineering

FHA0000242 Elementary German 1, 3 cr**The student is able to:**

The student knows how to communicate in the German language in simple everyday situations. He/she understands simple spoken and written standard language. The student knows some common vocabulary forms and structures used in basic speaking and writing. He/she knows the basics of German pronunciation and is aware of some German customs.

The target level according to The Common European Framework of Reference for Languages is A1.2.

FHA0000776 Elementary German 2, 3 cr

The student is able to:

The student can interact in the German language in simple everyday and working situations both in speaking and in writing. He/she can use the basic structures and common vocabulary of the German language. He/she can use understandable pronunciation and intonation of the learned words and phrases. He/she has knowledge about the German customs and business culture.

The target level according to The Common European Framework of Reference for Languages is A1.3.

FHA0000780 Microbiology, 3 cr

The student is able to:

The student can specify growth conditions of microbes and can apply them to environmental technology. The student knows basic methods of microbiology laboratory and the principles of aseptic working. The student can assess the results of analysis and write a report of them.

FHA0000784 Environmental Chemistry 1, 3 cr

The student is able to:

The aim of the course is that the student can define the quality of drinking water and lake water and can examine these qualities in the laboratory.

Prerequisites: Chemistry 2

FHA0000783 Environmental Legislation 1, 3 cr

The student is able to:

The student can use legislation data-bases and can solve problems that arise in the work of environment authorities. The student can specify the tasks of environment authorities and the administrative procedure of environmental permit.

FHA0000782 Energy Economics, 3 cr

The student is able to:

Student

recognizes essential global energy sources and limitedness of fossil sources.

is able to describe energy structure of Finland and explain main points of energy management and estimate on different ways of electricity production in viewpoint of economy and sustainable development. Manages EU's climate and energy strategy.

is able to estimate its implementation in energy management of Finland.

FHA0000781 Process Technology, 3 cr

The student is able to:

Student is able to describe main unit processes in industry and can tell how unit processes are connected to

different manufacturing processes. After this study unit students realize the processes in oil refinery, understand pulp and paper making and some other later named chemical processes and understand sustainable development in manufacturing processes.

FHA0000789 Environmental Health care, 3 cr

The student is able to:

The student can define the health effects of environment and evaluate their significance to society. The student can solve the problems that arise in the work of environment health care authorities with the help of legislation. The student knows the administrative procedures of permits and notifications.

FHA0000788 Worldwide Environmental Problems, 4 cr

The student is able to:

In this course students are preparing themselves for tasks which require wider understanding of worldwide environmental problems, their relationships, effects on societies and infrastructure and possible solutions.

After completing the course the student is able to:

look for more detailed information of worldwide environmental problems,
to use the collected information to create projects and/or programs in order to solve environmental problems,
to explain relationships between various worldwide environmental problems and their effects on national or local circumstances effecting on civil engineering, and
work as an advisor on worldwide environmental problems in various projects.

FHA0000790 Waste Water Treatment, 3 cr

The student is able to:

In this course students are preparing themselves to work as a member in a team designing conventional wastewater treatment plants.

After completing the course the student:

can separate wastewater treatment unit operations and give the basics of their design parameters,
can read and interpret wastewater treatment designs,
is able to consider the need of different wastewater treatment unit operations to compile a complete wastewater treatment plant for different kinds of wastewaters, and
is capable to work in a team designing a conventional wastewater treatment plant.

FHA0000791 Water Supply and Water Treatment, 3 cr

The student is able to:

In this course students are studying the principles of the Finnish legislation for Water Services, they are familiarizing themselves in water services development planning and preparing themselves to work as a member in a team designing water treatment plants.

After completing the course the student:

knows the principles of the Finnish water services legislation and can work as a member in a team preparing a water services development plan for a certain area,
can separate water treatment unit operations and give the basics of their design parameters,
can read and interpret water treatment designs,
is able to consider the need of different water treatment unit operations to compile a complete water treatment plant for different kinds of raw waters , and
is capable to work in a team designing a water treatment plant.

FHA0000794 Basics of Landscape Construction, 3 cr

FHA0000795 GIS-applications, 3 cr

The student is able to:

Tavoite: Opintojakson suoritettuaan opiskelija hallitsee paikkatiedon keskeisen sanaston, tiedon tuottamisen ja sen hyödyntämisen jokapäiväisessä työssä. Opiskelija tuntee yleisimmät paikkatietojärjestelmät ja ohjelmat sekä paikkatietoon liittyvän sanaston. Opiskelija hallitsee paikkatiedon tuottamisen, kohdetta kuvaavan sijainti-, ominaisuus- ja yhteystietojen muodostaman kokonaisuuden sekä tietojen laatua koskevat tiedot. Opiskelija hallitsee tiedon jakamisen intra ja internettiin. Opiskelija osaa hyödyntää ja soveltaa internetistä saatavaa paikkatietoa tietolähteenä.

Esitiedot: 20001031 Tietotekniikka, Maastomittaus

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, yhdyskuntatekniikka, paikkatieto, paikkatietojärjestelmät, GIS, Geographic Information Systems. Map

FHA0000796 Complementary Building Design, 4 cr

The student is able to:

Tavoite: Suomalaisen rakennusperinteen tunteminen ja sen huomioiminen rakennuksen arkkitehti- ja rakennesuunnittelussa ovat kurssin keskeisiä aiheita. Opintojaksolla perehdytään rakennetun ympäristön täydennys- ja korjausrakentamisen arkkitehtisuunnitteluun.

Esitiedot: Tekninen dokumentointi

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennussuunnittelu -sivuaineeseen.

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, rakennussuunnittelu

FHA0000711 Waste Management Systems, 3 cr

The student is able to:

The student recognizes the main parts of municipal solid waste management system. The student knows the main principles of waste collection, transportation, recycling and treatment.

FHA0000797 BIM in the Structural Engineering, 3 cr

The student is able to:

The student learns to make

- a single-family ArchiCad - model
- a TeklaStructure Concrete Portal Frame - model
- Robot steel and concrete models

FHA0000813 Steel Construction Design, 6 cr

The student is able to:

Tavoite: Opintojaksolla syvennyttään putkipalkkirakenteiden, hitsattujen, liitto- ja ohutlevyrakenteiden suunnitteluun ja käyttöön. Opintojaksolla perehdytään palomääräyksiin ja rakenteiden palomitoitukseen. Mitoitustehtävissä tutustutaan teoriaan ja toisaalta hyödynnetään olemassa olevia mitoitusohjelmistoja ja syvennetään rakenteiden laskennallisen mallinnuksen taitoja. Harjoitustyönä suunnitellaan monikerrosrakennuksen runko. Tavoitteena on antaa opiskelijalle valmiudet hankkia Teräsrakenteiden suunnittelijan pätevyys.

Esitiedot: Rakennetekniikka, Teräsrakenteiden peruskurssi

Yhteydet muihin opintojaksoihin: Opintojakso kuuluu rakennetekniikan pääaineopintoihin ja on esitietovaatimuksena opintojaksoon Teräsrakenteiden jatkokurssi

Asiasanat: Tekniikka ja liikenne, rakennustekniikka, talonrakennus, ammattiopinnot, teräsrakenteet

FHA0000815 Water Treatment Processes, 3 cr

FHA0000816 Water Treatment and Sewerage Systems for Sparsely Populated Areas, 3 cr

FHA0000819 Planning of Rehabilitation, 3 cr

FHA0000817 Areal Planning for Waste Management, 3 cr

FHA0000818 Field Screening Techniques and Laboratory Works, 3 cr

FHA0000820 Environmental Chemistry 1, 3 cr

The student is able to:

The student understands which factors have impact on chemical reactions in the environment and understand the properties of chemicals that are harmful in the environment. The course includes research of the water samples in a laboratory. The student learns to make a research plan and a research report and learns to evaluate credibility of the results.

FHA0000821 Environmental Chemistry 2, 3 cr

The student is able to:

The student understands behaviour of harmful chemicals in the environment concentrating especially on the chemicals which usually causes soil contamination in Finland. The course includes research of soil samples in a laboratory.

FHA0000824 Energy Economics, 3 cr

The student is able to:

Student recognizes essential global energy sources and limitedness of fossil sources. Student is able to describe energy structure of Finland and explain main points of energy management and estimate on different ways of electricity production in viewpoint of economy and sustainable development. Student manages EU's climate and energy strategy and is able to estimate its implementation in energy management of Finland.

FHA0000825 Process Technology, 3 cr

The student is able to:

Student is able to describe main unit processes in industry and can tell how unit processes are connected to different manufacturing processes. After this study unit students realize the processes in oil refinery, understand pulp and paper making and some other later named chemical processes and understand sustainable development in manufacturing processes.

FHA0000826 Environmental Economics, 3 cr

The student is able to:

The student will apply the principle of marginal cost theory and linear programming on optimization problems as well as go throw investment calculations. Multicriterial decision making tools like analytical hierarchy process will be familiar.

FHA0000639 Site Supervision, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija

osaa kehittää suunnitelmallisesti omia esimiestaitoja

ymmärtää eri tilanteiden vaikutuksen johtamistyyliin

osaa valmistautua neuvottelutilanteeseen

osaa kiinnittää huomiota siihen miten neuvottelutilanteessa sovitut asiat dokumentoidaan

osaa kiinnittää huomiota siihen, että sovitut asiat dokumentoidaan yksiselitteisesti muistioissa ja pöytäkirjoissa

osaa laatia työmaahan liittyviä kokousmuistioita ja -pöytäkirjoja

tuntee työnantajan ja esimiehen velvoitteet ja vastuut

tuntee työlainsäädännön sisällön ja osaan soveltaa sitä

tuntee oman alan työsopimusten sisällön ja osaan soveltaa niitä

FHA0000828 Hydrology and Groundwater Geology, 3 cr

The student is able to:

By completing the course acceptably a student

knows the basic hydrological parameters and the methods how these are determined

knows principles of usage of hydrological data in different kinds of situations

knows the forms of groundwater formations and the ways groundwater flow and its direction is determined

knows the structure of groundwater wells and principles of test pumping

knows effects of urbanization on hydrology and groundwater formations

knows principles of flood protection

is able to apply knowledge gained in different kinds of projects affecting hydrological cycle, civil engineering and water services

FHA0000827 Water Protection, Waste Water Treatment, 3 cr

The student is able to:

By completing the course acceptably a student

knows relevance of water protection and water services as part of community planning

knows requirements of wastewater treatment and principles of sewerage systems

knows principles of wastewater treatment unit operations and their applications in wastewater treatment plants

knows challenges of water protection and wastewater treatment and possible trends of development of both in future

can apply knowledge gained in different kinds of water protection and wastewater treatment projects.

FHA0000830 Cost Estimating, 6 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee tarjousvaiheen kustannuslaskennan, tavoite- ja tarkkailulaskennan, yksikköhintaluettelon ja maksuerätaulukon laadinnan periaatteet. Hän osaa laatia vertailulaskelmia, osaa hinnoitella lisä- ja muutostöitä sekä laatia jälkilaskelmia. Lisäksi hän osaa soveltaa investointilaskennan periaatteita rakennus- ja kiinteistöalan kannattavuuslaskelmissa.

FHA0000831 Procurement, 6 cr

The student is able to:

Opiskelija osaa hankintatoimen perusteet ja sopimuskäytännöt sekä hallitsee aliurakoiden ohjaustoimenpiteet.

FHA0000832 Quality Development Tools, 4 cr

The student is able to:

The significance of quality and the development tools for plan, improvement of processes and total quality will be studied. Application of environmental issues will be specially offered. Engineering quality development tools, like statistical control will be familiar.

Prerequisites: 10111304 Basics of Environmental Engineering

FHA0000834 Construction and Project Management, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään rakennushankkeen osapuoliin ja kulkuun, suunnitteluun ja urakointiin sekä sopimustekniikkaan. Projektitoiminnan osalta perehdytään projektin käsitteeseen, käynnistymiseen ja hoitamiseen sekä projektihenkilöstölle asetettaviin vaatimuksiin.

Esitiedot: 20001060 Projektityö, 17050700 Yhdyskuntatekniikka

Yhteydet muihin opintojaksoihin:

Asiasanat: tekniikka ja liikenne, ympäristötekniikka, rakennuttaminen, projektitoiminta, sopimuskäytäntö

FHA0000835 Industrial Water Management, 3 cr

The student is able to:

Tavoite: Opintojaksolla käsitellään teollisuuden vesihuollon perusteet, asumajätevesistä poikkeavien jätevesien johtaminen yleiseen viemärilaitokseen ja eri teollisuusalojen vedenhankintaan ja jätevesiin liittyviä esimerkkejä.

Esitiedot: 17052200 Vesiensuojelu, jätevedenpuhdistus, 17052300 Vedenhankinta, vesilaitostekniikka

Yhteydet muihin opintojaksoihin:

Asiasanat: tekniikka ja liikenne, ympäristötekniikka, vesihuolto, teollisuuden jätevesi

FHA0000839 Environmental Economic, 3 cr

The student is able to:

Tavoite: Perehdytään ympäristötaloudellisiin kustannus-hyötylaskelmiin ja muihin, erityisesti monitavoitteisiin edullisuustarkasteluihin ja päätöksenteon tukijärjestelmiin, joita tarvitaan arvioitaessa investointien ja hankkeiden kokonaisvaikutuksia.

Esitiedot: 17022400 Ympäristötekniikan perusteet

Yhteydet muihin opintojaksoihin: -

Asiasanat: Tekniikka, ympäristötekniikka, ympäristötalous, investointilaskenta, monikriteerimenetelmät

FHA0000836 Water Protection and Waste Water Treatment, 3 cr

The student is able to:

Tavoite: Opiskelija tuntee jäteveden puhdistusvaatimukset ja jätevesilaitosten toimintaperiaatteet. Opiskelija ymmärtää vesiensuojelun ja vesihuollon merkityksen yhdyskuntasuunnittelun osana. Opiskelija osaa laatia yhdyskuntajätevesien puhdistamon yleissuunnitelman. Opintojaksolla perehdytään vesiensuojelun ja jätevedenpuhdistuksen perusteisiin, mahdollisuuksiin ja kehitysnäkymiin.

Esitiedot: 17022400 Ympäristötekniikan perusteet

Yhteydet muihin opintojaksoihin: 17056400 Teollisuuden vesihuolto

Asiasanat: tekniikka ja liikenne, ympäristötekniikka, jätevesi, vesien suojelu

FHA0000840 Planning of Water Supply and Sewerage systems, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään vesijohtojen sekä hulevesi- ja jätevesiviemäreiden suunnitteluun. Tarkastellaan vesihuollon suunnittelujärjestelmää valtakunnallisista tavoitteista yleissuunnitteluun ja yksityiskohtaiseen suunnitteluun. Lisäksi esillä ovat vesihuoltoverkostojen laitteet ja rakentamiskustannukset.

Esitiedot: 17022301 Yhdyskuntatekniikan perusteet, 17022400 Ympäristötekniikan perusteet, 17022500 Geologia, maaperäoppi, 17050700 Yhdyskuntatekniikka

Yhteydet muihin opintojaksoihin: esitietona opintojaksolle 17052900 Vesihuoltoverkostojen ylläpito, yhteyksiä muihin vesihuollon opintojaksoihin

FHA0000837 Water Supply and Water Treatment Technology, 3 cr

The student is able to:

Tavoite: Opiskelija tuntee veden laatuvaatimukset, mahdollisuudet tavoitteiden saavuttamiseksi, vesihuollon uhat ja vesilaitosten käytön periaatteet. Opiskelija tuntee menettelytavat pohjavesien suojaamiseksi ja osaa laatia vedenpuhdistuslaitoksen yleissuunnitelman.

Opintojaksolla perehdytään yhdyskuntien ja teollisuuden vedenhankintaan, vesilaitostekniikkaan ja prosesseihin.

Esitiedot: 17022400 Ympäristötekniikan perusteet

Yhteydet muihin opintojaksoihin: 17056100 Hydrologia, pohjavesigeologia, 17056400 Teollisuuden vesihuolto

Asiasanat: tekniikka ja liikenne, ympäristöteknologia, vesilaitostekniikka, pohjavesi, tekopohjavesi

FHA0000841 Management Systems, 5 cr

The student is able to:

Tavoite: Opitaan rakentamaan, ylläpitämään ja kehittämään ISO- standardeihin pohjautuvia laatu- ja ympäristöhallintajärjestelmiä. Itse standardit ja niiden tulkinta dokumentaatiota ajatellen tulee tutuksi. Järjestelmien auditointi hallitaan. Lähtökohtana on tilaus-toimitusketjun logistinen hallinta.

Esitiedot: 17054303 Laatu- ja ympäristöjärjestelmien perusteet

Yhteydet muihin opintojaksoihin: -

Asiasanat: Tekniikka, ympäristöteknologia, Ympäristöhallintajärjestelmä, laatu- ja ympäristöjärjestelmä, auditointi

FHA0000843 Life Cycle Assessment and Product Development, 3 cr

The student is able to:

Tavoite: Perehdytään elinkaarikäsitteeseen, elinkaariarvioinnin (LCA) metodologiaan sekä elinkaariarvioinnin periaatteisiin ja pääpiirteisiin. Tavoitteena on, että opiskelija osaa käyttää jotain kaupallista elinkaariohjelmia sekä arvioida ja täydentää ohjelman tiedostoja. Perehdytään eräisiin muihin arviointityökaluihin. Opitaan hyödyntämään LCA:ta tuotteiden kehittämisessä ympäristöystävällisemmiksi.

Esitiedot: 17022400 Ympäristötekniikan perusteet

Yhteydet muihin opintojaksoihin: -

Asiasanat: Tekniikka, ympäristöteknologia, elinkaariarviointi, tuotekehitys

FHA0000844 Waste Management Processes, 3 cr

FHA0000845 Waste Management Processes, 3 cr

The student is able to:

The student knows the main mechanical, biological and thermal waste treatment processes and how are the typical treatment plants in Finland.

FHA0000846 Water Supply and Sewerage maintenance, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään vesijohto- ja viemäriverkostojen nykytilaan Suomessa sekä niiden ylläpitotarpeisiin. Tarkastellaan verkostojen kunnon tutkimista, saneeraustarpeiden arviointia sekä suunnittelua ja erilaisia saneerausmenetelmiä.

Esitiedot: 17022301 Yhdyskuntatekniikan perusteet, 17022400 Ympäristötekniikan perusteet, 17022500 Geologia, maaperäoppi, 17050700 Yhdyskuntatekniikka, 17052800 Vesihuoltoverkostojen suunnittelu

FHA0000857 Machine Dynamics, 4 cr**The student is able to:**

The student will have a solid understanding of the basics of dynamics and oscillation mechanics. The student will understand the importance of machine dynamics in modern machine structures and will be able to apply his/her knowledge to dynamic-based measurement and oscillation problems. After completion of the course, the student will be able to analyze the general properties of dynamics systems, oscillations of one degree of freedom, oscillations of several degrees of freedom and systems of continual mass.

FHA0000855 Welding Technology, 3 cr**The student is able to:**

Upon completion of the welding technology course, the student will know the principles of various welding methods, the devices used in these methods as well their application areas. The student will also know the behaviour of steel in welding, the reasons for the most common frailties created during welding and their implications on the process. The student knows the quality norms in welding so that s/he can evaluate when a specialized person is required for the design and production work. On the basis of the theoretical training, the student will also be able to continue in further specialized training.

FHA0000858 Sheet Metal Works, 3 cr**The student is able to:**

Having completed this course, the student knows the central production methods in sheet metal work. The student knows the principles of shearing, bending and deep drawing. He/she will also know tooling technology and the most common machines used in these methods. The student will know the effects of the material characteristics on the different methods.

FHA0000859 Heat Treatments, 3 cr**The student is able to:**

Having completed this course, the student knows the most common heat treatment methods used in workshops. He/she knows the microstructures of steel, their properties and how they can be changed through different methods of heat treatment. The student also knows about the application of different methods to different materials, and has basic knowledge about heat treatment equipment.

FHA0000861 Laser Technology, 3 cr**The student is able to:**

Having completed this course, the student knows the characteristics of the laser beam, the most common types of resonators and ways of delivering the beam. The student also knows the laser's most common areas of application in the manufacturing industry and can identify the requirements they set for equipment used. He/she knows the key parameters of laser machining in different processes and can compare laser machining to alternative methods. The student can also take safety factors into account in laser applications.

FHA0000856 Mechanical Engineering Measurements, 3 cr

The student is able to:

The student will become familiar with the general features of measurement systems and will be able to measure the variables of machines and other structures as well as analyze the measurement results. The student will understand the importance of measurement in product development and problem solving.

FHA0000864 Bioprocess Applications, 3 cr**FHA0000865 Process Design, 5 cr****FHA0000866 Ice Cream and Special Products, 3 cr****The student is able to:**

Tavoite:

Opintojaksolla perehdytään jäätelötuotteiden ja erikoisvalmisteiden tuotantoprosesseihin sekä tuotteita koskevaan lainsäädäntöön ja muihin erityispiirteisiin. Opiskelija tuntee raaka-aineiden, valmistuksen apuaineiden ja eri meijerikäsittelyjen vaikutuksen valmiin tuotteen ominaisuuksiin ja osaa tehdä tuotteen laadun edellyttämiä muutoksia valmistusprosesseihin. Opiskelija oppii valmistamaan erilaisia jäätelöitä ja erikoisvalmisteita sekä vaikuttamaan tuotteiden laatuominaisuuksiin.

FHA0000867 Cereal and Mill Technology, 7 cr**The student is able to:**

Tavoite:

Opintojaksolla perehdytään viljan fysikaalis-kemiallisiin ominaisuuksiin sekä tarkastellaan niitä leipomo-, rehu- ja myllyteollisuuden näkökulmasta.

FHA0000868 Biometry and Statistical Methods, 3 cr**The student is able to:**

Opintojakson tavoitteena on oppia hankkimaan tietoa koeasetelmiin ja ymmärtää mitattavien muuttujien kompleksisuus (vasteena käyrät ja pinnat). Opiskelija oppii empiirisen tiedon hankinnan suunnittelun tärkeyden (koeasetelmat, mitattavat muuttujat ja mittauksen suunnittelu, kyselylomakkeen laadinta, otoskoko- ja tehokkuuslaskelmat) ja ymmärtää hankitun aineiston tietokonepohjaisia analyysejä (kuvailu, graafiset tarkastelut, parametrinen estimoinnin ja testauksen, ei-parametriset testit). Opiskelija osaa tehdä johtopäätöksiä ja ymmärtää niiden luotettavuuden.

FHA0000869 Brewing Technology, 8 cr**The student is able to:**

Tavoite:

Opintojaksolla perehdytään syvällisemmin panimo- ja mallastustekniikkaan sekä niihin vaikuttaviin tekijöihin. Pääkäymiseen tutustutaan perinteisellä ja immotekniikalla sekä pienpanimo että suuren mittakaavan panimotoiminnassa. Opiskelija hallitsee myös oluen valmistuksen perusteet.

FHA0000870 Edible Fats, 5 cr**The student is able to:**

Tavoite:

Opintojaksolla perehdytään eri ravintorasvalmisteiden ryhmittelyyn, säädöksiin ja valmistusteknologiaan. Opiskelija on perillä aineksien ja prosessivaiheiden vaikutuksista valmiin tuotteen ominaisuuksiin ja osaa tehdä tuotteen laadun edellyttämiä muutoksia valmistusprosesseissa. Opiskelija ymmärtää laadunhallinnan merkityksen tuotteiden valmistuksessa. Harjoitustöissä opetusmeijerissä opiskelija oppii valmistamaan ravintorasvoja.

FHA0000871 Ice Cream and Special Products, 3 cr

The student is able to:

Tavoite:

Opintojaksolla perehdytään jäätelötuotteiden ja erikoisvalmisteiden tuotantoprosesseihin sekä tuotteita koskevaan lainsäädäntöön ja muihin erityispiirteisiin. Opiskelija tuntee raaka-aineiden, valmistuksen apuaineiden ja eri meijerikäsittelyjen vaikutuksen valmiin tuotteen ominaisuuksiin ja osaa tehdä tuotteen laadun edellyttämiä muutoksia valmistusprosesseihin. Opiskelija oppii valmistamaan erilaisia jäätelöitä ja erikoisvalmisteita sekä vaikuttamaan tuotteiden laatuominaisuuksiin.

FHA0000872 Powders and Whey Products, 6 cr

The student is able to:

Tavoite:

Opintojaksolla perehdytään kuivattujen tuotteiden ja tiivisteiden valmistukseen, prosessien erityispiirteisiin ja heran jatkojalostukseen. Opiskelija ymmärtää valmistusteknologian merkityksen tuotteen mikrobiologisen, kemiallisen ja fysikaalisen laadun kannalta. Opiskelija tuntee tuotteiden lainsäädännön ja osaa tehdä tuotteen laadun edellyttämiä muutoksia valmistusprosesseihin. Opiskelija oppii valmistamaan jauheita ja hallitsemaan pienimuotoista jauheen valmistusta.

FHA0000874 Operations and Project Management, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään johtamisen ja projektinhallinnan terminologiaan ja erilaisten organisaatioiden toimintaan. Opiskelija osaa suunnitella, organisoida ja kehittää omaa toimintaa työelämän tarpeiden mukaan. Opiskelija saa valmiuksia esimiestehtäviin ja ymmärtää esimiestyöhön kuuluvat vaatimukset. Opiskelija ymmärtää projektitoiminnan osa-alueet ja osaa toimia projektitehtävissä.

FHA0000893 Water Chemistry, 3 cr

FHA0000896 Mechanical and Equipment Technology, 3 cr

The student is able to:

Tavoite:

Opiskelija perehtyy prosessiteollisuuden yleisiin laitteisiin, kuten pumppuihin, kompressoreihin, venttiileihin, ja kappaletavaraiteollisuuden ohjausjärjestelmiin. Opiskelija tuntee pneumatiikan ja ohjausjärjestelmien perusteet, kappaletavaraiteollisuuden tärkeimmät anturit, osaa selvittää sähköpneumaattisten laitteiden toimintaa sekä lukea alan suunnitelmia

FHA0000895 Process Measurements, 3 cr

The student is able to:

Tavoite:

Opiskelija tuntee yleisimmät prosessitekniikkaan liittyvät mittaukset, mittaussuunnitelmat ja -laitteet. Opiskelija ymmärtää prosessimittauksen fysikaaliset/kemialliset mittaussuunnitelmat ja osaa arvioida eri menetelmien soveltuvuutta eri mittaussuunnitelmiin.

FHA0000894 Basics of Process Technology, 3 cr

FHA0000897 Biochemistry, 3 cr

FHA0000900 Food and Packaging Technology, 5 cr

The student is able to:

Tavoite:

Opintojaksolla perehdytään elintarviketeollisuuden valmistus- ja säilöntämenetelmiin sekä pakkausmenetelmiin, materiaaleihin ja pakkauskoneisiin. Opiskelija tuntee uusimmat elintarviketeollisuuden raaka-aineet, valmistus- ja prosessointimenetelmät. Laboratoriotöissä opiskelija oppii säilönnän periaatteet ja optimoinnin.

Opiskelija tuntee elintarvikepakkauksille asetetut vaatimukset, pakkausten kehityssuunnat, pakkausten testausmenetelmät ja pakkausten hyötykäyttömahdollisuudet.

FHA0000899 Process Technology, 6 cr

The student is able to:

Tavoite:

Opiskelija perehtyy erilaisiin elintarviketeollisuuden ja ympäristötekniikan keskeisiin yksikköprosesseihin, niiden yleisiin periaatteisiin ja prosessilaitteisiin. Opiskelija hallitsee lämmön- ja aineensiirron perusmekanismit ja kiintoaineen erotustekniikat, ja oppii soveltamaan näitä käytännön prosessitilanteissa, esimerkkinä lämmönsiirto, haihdutus, kalvosuodatus, tislauk, selkeytys, sentrifugointi, suodatus.

FHA0000901 Product Development, 4 cr

The student is able to:

Tavoite: Opiskelija ymmärtää kulttuuristen ja yhteiskuntaan liittyvien tekijöiden merkityksen kulutuskäyttäytymiseen, markkinointiin ja tuotteen kehittämiseen. Opiskelija tuntee elintarviketeollisuuden trendit. Opiskelija oppii tuotekehityksen eri vaiheet ideoinnista tuotteen valmistukseen ja kaupallistamiseen. Opiskelija osaa suorittaa aistinarviointia tuotteille ja osaa käyttää erilaisia arviointimenetelmiä. Opiskelija ymmärtää ravintoaineiden ja elintarvikkeiden merkityksen ravitsemuksessa ja ymmärtää ravinnon ja terveyden välisen yhteyden. Opiskelija oppii myös eri käsittelyprosessien vaikutuksen elintarvikkeiden ravitsemukselliseen arvoon.

FHA0000902 Business and Production Economy, 3 cr

The student is able to:

Opintojaksolla perehdytään yritystoiminnan suunnitteluun teknologiayrityksen perustamisen näkökulmasta.

Tavoitteena on oppia arvioimaan yritysideoita, suunnittelemaan pääpiirteissään palveluja, markkinointia ja tuotteita tuottavat toiminnot investointineen sekä arvioimaan laskelmien kautta toiminnan kannattavuutta, vakavaraisuutta ja tuottavuutta.

FHA0000590 Building Automation, 5 cr

The student is able to:

A student knows most important application areas in building control systems. A student understands principles of heating, plumbing and air conditioning automation. A student understands the principles of KNX standard based building automation and can design applications based on this standard.

FHA0000414 Programming, 4 cr

The student is able to:

Students know the basic principles of programming, the basics of a high level programming language and the phases in software generation. Students know the main principles of procedural and object-oriented programming.

FHA0000419 Electrical Design, 4 cr

The student is able to:

Having completed the course, students:

know the basics of industrial electricity systems
can design industrial main and control circuit diagrams using computer software
can design and size electric controls for motor outputs
know the legislation and documentation in connection with electrical installations.

FHA0000910 Basics of Meat Technology, 5 cr

The student is able to:

Tavoite:

Opintojaksolla perehdytään lihan tuotantoon, lihan rakenteeseen ja kemiallisiin ominaisuuksiin, lihan laatuun vaikuttaviin tekijöihin ja käsittelyhygieniaan. Opiskelija saa laaja-alaisen näkemyksen alan tuotannosta ja sen toiminnasta.

FHA0000911 Fermented Milk Products, 6 cr

The student is able to:

Tavoite:

Opiskelija osaa hapatettujen maitovalmisteiden valmistusprosessit ja -laitteistot sekä tuotteiden pakkaamisen. Opiskelija tietää tuotteita koskevan lainsäädännön ja laadunhallinnassa käytetyt analyysimenetelmät. Opiskelija tuntee tärkeimmät hapatettuja maitovalmisteita valmistavat yritykset kotimaassa ja ulkomailla ja tuntee eri valmistajien tuotteita. Opiskelija oppii tuntemaan meijerituotteiden valmistuksessa käytettävä hapatteet, niiden ominaisuudet, toimintaan vaikuttavat tekijät ja hapatteen merkityksen tuotteen valmistuksessa. Harjoitustöissä opetusmeijerissä opiskelija oppii valmistamaan meijerihapatteita ja hapatettuja maitovalmisteita sekä analysoimaan näitä.

FHA0000915 Vehicle and Transport Technologies, 3 cr

The student is able to:

This course teaches about the key equipment, accessories and official systems of vehicle- and transport technology, as well as the principles of dimensioning transport units and the key applications of different units. Having completed this course, the student can understand the opportunities and challenges presented by the equipment and its dimensioning in traffic and transport planning.

FHA0000916 Chemistry, 3 cr

The student is able to:

Objectives: A key objective is the assimilation of the basics of chemistry to the extent that the student, in the actual vocational subjects in his/her field, can understand the significance of chemistry as part of his/her own field.

Keywords: engineering, mechanical engineering, chemistry

FHA0000926 Basics of Traffic Planning, 4 cr

The student is able to:

Having completed this course, the student knows the key principles of the planning of systems for pedestrians, bicycles, public transport and cars, and can evaluate the practical efficiency of planning solutions. He/she also possesses the basic knowledge to carry out the traffic surveys and traffic-flow reviews required for traffic planning.

FHA0000927 Traffic Safety, 4 cr

The student is able to:

Having completed this course, the student has the skills to carry out overall assessment of the management of traffic safety as part of traffic planning and traffic system development. He/she can evaluate factors affecting traffic

safety as well as the solutions best suited to different problem situations. The student is also familiar with making and evaluating traffic safety plans.

FHA0000928 Transport Modes, 3 cr

The student is able to:

Having completed this course, the student knows the basics about road-, rail-, water-, air- and intermodal forms of transport, has the skills to assess the use of different transport modes, factors affecting transport needs and the transport economy, and can manage international consignments.

FHA0000929 Engineering Physics, 3 cr

The student is able to:

Having completed this course, the student knows the basics of rotary movement and rigid body dynamics. The student can determine the value of the moment of inertia of a rigid body based on tabular data, and can apply the basic equation of rotary movement to practical situations. The student knows the basics of harmonic oscillating motion, mechanical wave motion and acoustics, and understands the significance of these phenomena in technical applications.

FHA0000930 Computer Based Mathematics, 3 cr

The student is able to:

Having completed this course, the student knows the theoretical basics of computer-aided mathematics, and can use some modern mathematical software. The student can make use of its features in different mathematical problems and professional technical applications.

FHA0000931 Traffic Legislation, 3 cr

The student is able to:

Having completed this course, the student knows about key legislation affecting traffic and guiding traffic planning (e.g. the Road Traffic Act, legislation on public transport) and is familiar with legislative mechanisms both on an EU and domestic level. He/she is familiar with key standards, guidelines and legislation related to procurement, and has an understanding of where regulations come from, which particular matters are subject to regulation and how regulations are observed.

FHA0000932 Project Management in the Traffic Sector, 3 cr

The student is able to:

Having completed this course, the student knows the procedures related to Public Procurement Act and project-based working methods, and possesses the skills to make offers. The course also teaches students to use project management tools.

FHA0000933 Traffic Planning Software, 3 cr

The student is able to:

Having completed this course, the student possesses the basic skills in the operation of software generally used in the location and geo-positioning analyses of traffic demand as well as in the application of such software to practical planning needs.

FHA0000934 Physics Labs, 3 cr

The student is able to:

Having completed this course the student can:

- work safely in a laboratory
- make a connection between theory and practice
- make high-quality technical reports utilising different word-processing software
- use simple measuring tools
- evaluate errors related to measurement and handle elements of error calculation
- process measurement results in a sensible way using mathematical programmes
- work in a group taking others into consideration.

FHA0000935 Mechanical and Automation Engineering, 4 cr

The student is able to:

Having completed this course, the student has a basic knowledge of the boundary conditions and progress of mechanical and automation engineering design, and the skills to discuss the applications of mechanical and automation engineering in situations where they can be developed and maintained for the needs of traffic and transport.

FHA0000936 Environmental Technology, 4 cr

The student is able to:

Having completed this course, the student understands the problems caused by the environmental impact of traffic and infrastructure construction (noise, vibration, emissions, energy, natural resources, climate) and how to evaluate them. He/she understands the statutory environmental impact assessment (EIA) method and the method for assessing the impact of plans and programmes.

FHA0000937 Logistics, 3 cr

The student is able to:

Having completed this course, the student knows logistics as a concept, different logistical concepts and the historical aspects of these concepts. He/she understands logistics as part of a framework formed by production, transportation, warehousing, the order and supply chain, information flow and recycling flow. The student knows the boundary conditions for procurement, how to make offers and the different grounds for inviting tenders for procurement and making decisions. He/she knows the key aspects concerning warehousing concepts. The student understands the significance of logistics in the competitive local, national and international situations of companies.

He/she understands waste treatment and its significance to the business of companies. The student knows the principles and most common problems concerning the different internal and indirect data systems of companies. He/she knows the principles of different production control systems.

FHA0000812 Computer-aided Design, 3 cr

The student is able to:

Opiskelija perehtyy teräsrakenteiden suunnittelussa käytettyihin suunnitteluohjelmistoihin, mm. Staad-ohjelmistoon.

FHA0000957 Pollution Control in Industrial Processes, 3 cr

The student is able to:

Tavoite: Opiskelija tietää teollisuuden ilmansuojelun tavoitteet ja tutustuu tavanomaisempien teollisuusprosessien ilmapäästöihin ja niiden muodostumiseen. Opiskelija perehtyy vaihtoehtoihin päästöjen vähennysmenetelmiin ennen kuin paneutuu eri puhdistustekniikoiden valintakriteereihin ja itse päästöjen puhdistukseen eri sovellutuksissa. Kurssilla käydään läpi teollisuuden ilmapäästöjä koskevat uudet ja tulevat direktiivit yksityiskohtaisemmin.

Esitiedot: 17022201 Prosessitekniikka, 17052500 Ilmansuojelu

Yhteydet muihin opintojaksoihin: 17056400 Teollisuuden vesihuolto, 17055400 Ympäristötalous

Asiasanat: Tekniikka ja liikenne, ympäristöteknologia, ammattiopinnot, teollisuuden ilmapäästöt, prosessimuutokset, päästöjen puhdistus

FHA0000960 Elementary German 2, 3 cr

FHA0000958 Business German 1, 3 cr

The student is able to:

Tavoite: Opiskelija saa valmiuksia selvittää yleisimmistä työelämän kommunikaatiotilanteista sekä suullisesti että kirjallisesti saksan kielellä.

Esitiedot: Saksan kielen aktivointi tai vastaavat tiedot ja taidot

Asiasanat: kieliopinnot, saksa, vapaasti valittavat opinnot, sivuaineopinnot

FHA0000961 Water Treatment and Sewerage Systems for Sparsely Populated Areas, 5 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään haja-asutusalueiden vedenhankinnan ja jätevesihuollon vaihtoehtoihin ja niiden toteutukseen. Vedenhankinnan osalta syvennytään pohjavesiin ja niiden hyödyntämiseen, kaivoihin ja lähteisiin. Jätevesihuollon osalta syvennytään säädöksiin, vastuihin, vaihtoehtoihin tekniikoihin ja jätevesijärjestelmien ylläpitoon. Opintojaksolla tutustutaan myös osuuskuntamuotoisen vesihuollon järjestämiseen.

Opiskelija kykenee selviytymään itsenäisesti tavanomaisimpien kiinteistökohtaisten vesihuollon ratkaisujen suunnittelusta ja hän kykenee osallistumaan sellaisen työryhmän työskentelyyn, joka suunnittelee vaativampia, esimerkiksi usean kiinteistön yhteisiä, vesihuoltoratkaisuja.

Esitiedot: Ympäristötekniikan perusteet, Yhdyskuntatekniikan perusteet, Pientalorakentaminen, Maastomittauksen perusteet, Kemia, Ympäristökemia, Mikrobiologia, Ympäristöterveydenhuolto, Ympäristölait ja -hallinto
Asiasanat: vesihuolto, haja-asutus, haja-asutusalue, vedenhankinta, jätevesienkäsittely, vesiosuuskunta, vesihuolto-osuuskunta, kaivo, porakaivo, lähde, maaperäkäsittely, pienpuhdistamo

FHA0000925 Traffic Policy and Traffic Systems, 4 cr

The student is able to:

Having completed this course, the student knows the duties and responsibilities of traffic policy actors, can understand the significance of traffic and the nature of the traffic market, knows the key traffic policy objectives of the EU and Finland, can identify the special features of the Finnish traffic system as well as the strong points of different forms of transport in different conditions (rural, suburban, connections between centres) and can understand the target-setting and means behind traffic policy.

FHA0000959 Elementary German 1, 3 cr

FHA0000860 Machining, 3 cr

The student is able to:

Having completed this course, the student knows the theoretical modeling of machining. Modeling focuses mainly on turning. The student knows the main cutting tool materials and their characteristics. Also, he/she recognizes the characteristics of the most common work materials from the method perspective. The student knows the different machining methods, as well as their areas of application and limitations. He/she also knows the tools required for the different methods, and the requirements that these methods set for the fixturing of the work piece.

FHA0000787 Chemistry 2, 3 cr

FHA0000898 Biotechnology, 3 cr

The student is able to:

Tavoite:

Opiskelija tuntee bioteknisen kokonaisprosessin vaiheet, bioprosessien raaka-aineet ja niiden käsittelyn, tuotanto-organismien valintaan vaikuttavat seikat, bioreaktorien rakenteen ja toiminnan sekä tuotteen talteenotossa ja puhdistuksessa tarvittavat toiminnot. Opiskelijalla on yleiskuva Suomen bioteollisuudesta ja sen keskeisistä suuntauksista.

FHA0000642 Mathematics 1, 3 cr

The student is able to:

Opintojakson tavoitteena on syventää tekniikan ongelmissa sovellettavien matemaattisten periaatteiden ja käsitteiden ymmärtämistä sekä kehittää rakennusmestariopinnoissa ja töissä tarvittavia matemaattisia valmiuksia. Opintojaksolla perehdytään algebran perusteisiin: lausekkeiden käsittelyyn, yhtälöiden ja yhtälöryhmien ratkaisuun sekä trigonometrian ja vektoriopin alkeisiin.

FHA0000823 Environmental Legislation 2, 3 cr

The student is able to:

The student knows the administrative procedure of environmental impact assessment and the responsibilities in environmental damage cases. The student can use Nature Conservation Act and Water Act in permit processes and in monitoring environment. The student can evaluate the influence of the EU to legislation in Finland.

FHA0000938 Basics of Smart Traffic, 3 cr

The student is able to:

Having completed this course, the student knows how smart traffic systems can influence traffic demand and the choice of form of transport. Course content includes information, transport management and payment systems that boost private motoring and public transport.

FHA0000829 Water Resources, Water Treatment Technology, 3 cr

The student is able to:

By completing the course acceptably a student knows the content of legislation concerning water services and importance of water services as a part of community planning

knows requirements of both raw and potable water

knows principles of water treatment unit operations and their applications in water treatment plants

knows basics and principles of general planning of a water treatment plant

knows practices of groundwater protection

knows principles of municipal and areal water services development planning

knows future challenges of water services and water treatment and possible development paths

is able to apply knowledge gained in different kinds of development projects in water services and water treatment plants

FHA0000779 Mechanics 2, 6 cr

The student is able to:

Student is able to manually calculate deflections of beams applied by different loads. He or she can solve internal forces and moments and deflections of statically indeterminate constructions.

Student knows plastic analyses of plane frames and yield line analysis of slabs. She or he is familiar with torsion

and is able to calculate deflections caused by torsion.

Student is able to calculate buckling forces of columns according to different theories.

FHA0000704 Economics of the Construction Industry, 3 cr

The student is able to:

Opiskelija osaa ohjatusti laatia uudisrakennushankkeen hankesuunnitteluvaiheen tilaajan budjettiraamin määrittämistä palvelevan tavoitehintalaskelman ja suunnittelun kustannusohjauksessa käytettävän rakennusosavaruion sekä urakkatarjousvaiheen suoritte pohjaisen kustannusarvion.

FHA0000770 Structural Engineering 1, 4 cr

The student is able to:

OBJECTIVES

After the course the students

- Can recognize typical load bearing structural systems and name the elements carrying the loads.
- Can separate and formulate design task to design parts of simple one or two storey buildings.
- Can specify and calculate actions affecting to simple structures.
- Are able to specify load combinations based on actions affecting on structure.
- Can design simple bracing system for a one or two storey building.
- Can list and describe key properties of timber affecting to structural design.
- Can design simple timber beams, columns and nailed connections.
- Knows the Eurocodes so that can use Eurocodes as source of information regarding the design tasks.

CONTENT

Typical load bearing structures, actions affecting structures (self weight, snow, wind, imposed loads), Load combinations, frame systems and bracing, properties of timber, timber products, timber under compression, tension, shear and bending. Basics of using Eurocodes.

FHA0000968 Basics in working german, 3 cr

The student is able to:

Tavoite tähän, muistakaa myös enkkoversio.

FLM0000777 Utilising biodegradable waste, 3 cr

FLM0000750 Processing and utilisation of waste water, 5 cr

FHA0000970 Project: Information Management Plan, 3 cr

The student is able to:

Learning outcomes: Students can plan and implement a modern automatic production system.

FHA0000971 Project: Integration of Automation and Information systems, 6 cr

The student is able to:

Learning outcomes: Students get to know the meaning of integration between automation and information systems with the point of manufacturing view and can implement information integration on practice by using standard interfaces.

FHA0000969 Project: Development of Automation Production System, 6 cr

The student is able to:

Learning outcomes: Students can plan and implement a modern automatic production system.

FHA0000972 Seeing Finland through Culture, 3 cr

The student is able to:

The aim of the course is to support the foreign students at HAMK to integrate in Finland by getting familiar with Finnish society by culture which means arts in a wider concept. In practice this means lectures concerning Finnish culture: music, literature, fine arts and design. The course will also include visits to cultural events such as concert, theatre, art exhibition, etc. Part of the course (in the spring) will be carried out as Studia Generalia -model which makes the audience larger and more varied. The target groups in Studia Generalia -lectures are e.g. HAMK students and staff, and Hämeenlinna inhabitants and organisations. From this viewpoint the aim is regional development, which means encouraging local internationalization process by strengthening national identity of Finnish people.

FHA0000973 Finnish Language and Culture, 3 cr

The student is able to:

Aims

The common option for all students will be organised in Hämeenlinna. It concentrates on the Finnish language and the Finnish culture. It is possible to study Finnish also at the different units of Häme Polytechnic.

Content

- * Finnish language
- * Elementary skills in writing and speaking Finnish
- * Culture
- * Finnish people yesterday and today

FLM0000737 Professional growth, 3 cr

FLM0000747 English for energy experts, 3 cr

FLM0000754 Energy Counselling, 3 cr

FLM0000748 Inorganic and organic chemistry, 6 cr

FLM0000749 Environmental Project, 10 cr

FLM0000784 Energy efficiency in buildings, 3 cr

FLM0000755 Introduction to Bachelor's Thesis and seminar work, 4 cr

FLM0000752 Land and water ecosystems, 6 cr

FLM0000775 Environmental technology project 1, 6 cr

FLM0000776 Environmental technology project 2, 5 cr

FLM0000785 Intesive week in Russia, 3 cr

FLM0000739 Foundation course in chemistry and physics, 4 cr

FLM0000740 Mathematics Basics, 3 cr

FLM0000741 Electricity and Wave Motion, 3 cr

FLM0000744 ICT SKILLS I, 3 cr

FLM0000735 Energy Efficiency in Community Structure, 3 cr

FLM0000756 Research Methods and Seminar Work, 5 cr

FLM0000751 Image Processing (Photoshop), 3 cr

FLM0000757 Development of centres, 5 cr

FLM0000759 Visual communication, 3 cr

FLM0000760 Waste disposal and planning and supervision of landfills, 3 cr

FLM0000761 Traffic in urban planning, 5 cr

FLM0000762 Material recycling as business, 3 cr

FLM0000763 Surveying, Mapping and Real Estate Formation, 3 cr

FLM0000765 Novapoint design software, 3 cr

FLM0000767 Process planning and scaling, 4 cr

FLM0000768 English for urban planning, 3 cr

FLM0000769 Equipment solutions for renewable energy, 3 cr

FLM0000770 Business and renewable energy, 3 cr

FLM0000772 Waste management of a company or public organization, 3 cr

FLM0000738 Master planning, 6 cr

FLM0000773 Environmental Geotechnology and Earth Construction, 3 cr

FLM0000774 English for environmental protection technology, 3 cr

FLM0000743 Commercial Mathematics in Environmental Planning, 3 cr

FLM0000745 Thermology and Transport Mechanisms, 3 cr

FLM0000764 Novapoint, 3 cr

FLM0000742 Vectors and Matrices, 3 cr

FLM0000753 Archicad, 3 cr

FLM0000746 Biomasses and biowastes and their use for energy, 4 cr

FLM0000758 Street engineering, 5 cr

FLM0000766 Clean water and sanitation, 3 cr

FLM0000771 Renewable energy project, 6 cr

FHA0000696 Maintenance of Water Supply Networks, 3 cr

The student is able to:

The actual physical state of the networks is the basis for maintenance. Network investigation, need for preparation and renovation, planning and implementation of the plans will be known.

FHA0000842 Environmental and Safety Risks, 3 cr

The student is able to:

Tavoite: Perehdytään ympäristöriskien analysoinnin menetelmiin riskien systemaattisesta tunnistamisesta kvalitatiiviseen ja kvantitatiiviseen analyysiin sekä stokastiselta että deterministiseltä pohjalta. Työterveys- ja turvallisuusjärjestelmät riskienhallinnan työkaluna käydään läpi.

Esitiedot: 17054303 Laatu työkalut

Yhteydet muihin opintoihin: -

Asiasanat: Tekniikka, ympäristöteknologia, Työterveys- ja turvallisuusjärjestelmä, riskienhallinta

FHA0000719 Basics of Environmental Technology, 3 cr

The student is able to:

By completing the course acceptably a student

can apply most essential professional terms related to soil protection, noise control, waste management, rehabilitation of water sheds and their catchment areas, water services and air protection

knows principles of the assessment of the State of the Built Environment (ROTI - assessment) and its most essential results

knows basics of soil protection, noise control, waste management, rehabilitation of water sheds and their catchment areas, water services and air protection on the level advanced courses of each subject can be taken without difficulties

knows basics of environmental legislation and knows where to find further information about the same when a need arises

with guidance, knows how to interpret documents and plans related to soil protection, noise control, waste management, rehabilitation of water sheds and their catchment areas, water services and air protection

is able to see the connection between news of environmental technology and other up-to-date information and civil and construction engineering.

FLM0000813 Physics and Chemistry Basics, 3 cr

FLM0000814 Vectors and matrixes, 3 cr

FLM0000815 ICT Skills, 3 cr

FLM0000816 Strength of materials 1, 3 cr

FLM0000817 Logistics and production control, 3 cr

FLM0000818 Basics of materials science, 4 cr

FLM0000819 Basic course in marketing, 3 cr

FLM0000820 Electrical engineering and automation, 3 cr

FLM0000821 Industrial automation 1, 4 cr

FLM0000807 Occupational safety and safe use of machines, 4 cr

FLM0000822 Entrepreneurship studies, 4 cr

FLM0000823 CNC machining, 3 cr

FLM0000824 Furniture technology, 3 cr

FLM0000825 Project 2 - Product development and marketing, 5 cr

FLM0000808 Project 3 - Research and development, 5 cr

FLM0000826 Drying and heat treatment of wood, 3 cr

FLM0000827 Production of wood constructions, 3 cr

FLM0000828 Mechanical engineering lab course, 3 cr

FLM0000829 Plastics engineering lab, 4 cr

FLM0000830 Plastics processing techniques, 4 cr

FLM0000831 Mould technology, 3 cr

FLM0000832 Finishing plastic products, 2 cr

FLM0000809 Project 2, 4 cr

FLM0000833 Engineering design 3D CAD, 4 cr

FLM0000834 Shape and structure of flexible clothes, 3 cr

FLM0000835 Structure and marketing of a collection, 5 cr

FLM0000836 Computer-aided pattern making, 5 cr

FLM0000810 English for clothing and textile technology, 3 cr

FLM0000811 Purchasing in the clothing industry, 6 cr

FLM0000812 Clothing industry production project, 6 cr

FLM0000837 Production planning in the clothing industry, 4 cr

FLM0000838 Making patterns for production, 3 cr

FLM0000839 Business English, 3 cr

FLM0000840 Plastic film technology, 3 cr

FLM0000841 Learning and professional growth, 3 cr

FHA0000976 Intercultural Communication Today, 5 cr

FHA0000768 Construction Management, 5 cr

The student is able to:

By the end of this course the student is able to explain and justify what different factors determine the success or failure of a construction project. The student can determine four dials of construction management and can solve basic site planning tasks. The student is also able to plan and solve problems which are connected to detailed construction schedule and costs.

FHA0000979 Leadership and Management in Practice (RYLA seminars), 3 cr

The student is able to:

RYLA (Rotary Youth Leadership Awards) -seminaarit:

kehittää nuorten johtamistaitoa
kuulee kokemuksia tosielämän johtajilta
kehittää opiskelijan vuorovaikutustaitoja ja organisaatiokäyttäytymistä

FHA0000988 Project Management (FUAS Innovation School), 2 cr

FHA0000989 Entrepreneurship and Innovation (FUAS Innovation School), 4 cr

FHA0000990 Information Search and Processing (FUAS Innovation School), 2 cr

FHA0000991 Development project - Mechanical Engineering (FUAS Innovation School), 7 cr

FHA0000981 Reliability Centred Maintenance, 4 cr

The student is able to:

Tuition in Finnish language: Opiskelija hallitsee luotettavuuskeskeisen kunnossapidon (Reliability Centred Maintenance, RCM) ominaisuudet. Opiskelija osaa arvioida sen edut ja soveltamismahdollisuudet tuotantolaitoksessa.

FLM0000871 Differential and integral calculus I, 3 cr

FHA0001017 Software Development Project - Information Technology (FUAS Innovation School), 7 cr

FHA0001018 Traffic Planning Project - Traffic (FUAS Innovation School), 7 cr

FLM0000874 Energy counselling, 3 cr

FLM0000876 Energy efficiency in the community structure, 3 cr

FHA0001019 Technology Application in Automation, 4 cr

The student is able to:

Students can design and implement a new technology based automation application. Student can act as a group member in project team and formulate documentation needed in project application design and implementation phase.

FHA0001022 Development project - Engineering (FUAS Innovation School), 7 cr

The student is able to:

A working life project is a mechanical engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FLM0000875 Energy Efficiency in Buildings, 3 cr

FHA0001032 Food Hygiene, 1 cr

FHA0001033 Food Hygiene, 1 cr

The student is able to:

Tämän opintokokonaisuuden tavoitteena on saavuttaa yleiset elintarviketyöntekijältä vaadittavat, STM asetuksessa 1115/2001 luetellut hygieniosaamistaidot. Keskeistä on saavuttaa valmius tunnistaa ja hallita elintarvikkeiden käsittelyyn liittyviä hygieniariskejä siten, että työntekijä voi omalla työskentelyllään ehkäistä elintarvikkeiden turhia pilaantumisia ja ruokamyrkytysten aiheutumista.

FHA0001035 Applied Mathematics, 3 cr

The student is able to:

Students know the methods used when analysing linear space-time continuum and discrete time systems. Students know spectrum analysis and mathematics in connection with automation engineering.

FHA0001036 Control Engineering, 4 cr

The student is able to:

Students know the unit processes used in process technology and the operation of closed loop control both on the time domain and frequency domain, Laplace basis. They can do the tuning of a PID controller. Students know the basics of digital signal processing such as digital filtering, signal linearization and the digital PID algorithm.

FHA0001037 Fieldbus Technology, 3 cr

The student is able to:

Students know process automation fieldbuses and the configuration methods of fieldbuses in automation systems.

Students can analyze error diagnostics in connection with bus devices, know most important installation issues and design of field segments.

FHA0001038 Maintenance Economics, 4 cr

The student is able to:

Student knows an overall view to the economics of industrial maintenance. Student is able to estimate the meaning of economic matters in optimizing maintenance work. He can calculate the profitability of machine investments. Student knows the terminology of industrial maintenance, typical ways to organize maintenance, the basic maintenance operations and the method to choose them.

FHA0001027 Human Machine Interface, 4 cr

The student is able to:

Students can use and configure control and monitoring programs. Students know how to execute them in different operational environments. Students can design small applications, which are tested in a laboratory setting.

FHA0001039 Networks in Automation, 4 cr

The student is able to:

Students know how modern, open automation system is implemented and how it operates, as well as how information technology is utilised in automation. Students know data communication methods between automation systems.

FHA0001040 Robotics, 4 cr

The student is able to:

Students know the terminology of robotics, the most popular types of robots and typical application possibilities. Students can use a robot and make application programs. Students can estimate the economical benefits of using robots.

FHA0001041 Machine Vision, 3 cr

The student is able to:

Students know machine vision's application areas. They know the theoretical background in image processing. Students know methods to design machine vision in production automation. They can make a small machine vision application in laboratory environment.

FHA0001042 Reliability Centered Maintenance, 4 cr

The student is able to:

Student knows features and benefits of Reliability Centered Maintenance, RCM. Student can estimate advantages and application areas of RCM in industrial plant. Student can estimate the reliability of production machines.

FHA0001043 Maintenance Information Systems, 4 cr

The student is able to:

Student can use management systems in maintenance work and automatic machine monitoring systems. Student knows the system interfaces to programmable logic controllers and control systems. Student can put into practice the implementation of new maintenance information systems.

FLM0000893 Application of environmental legislation, 5 cr

FHA0001100 Bid-Supply Chain Management, 5 cr

FHA0001101 Leadership, 6 cr

FHA0001102 Commercial and Personnel Agreements, 4 cr

FHA0001103 Industrial Maintenance, 5 cr

FHA0001104 Industrial Service Business Concepts, 5 cr

FHA0001105 Industrial Marketing Operations, 4 cr

The student is able to:

The student knows the basic marketing concepts of an Industrial Company. S/He suggests a customer-focused philosophy and long-lasting customer relationships, as well as the importance of the marketing role for the company's profitability and success.

FHA0001106 Productional Network Management and Sourcing, 5 cr

FHA0001108 Product Development and Life-Cycle Management, 5 cr

FHA0001109 Digital Product Process Management, 5 cr

FHA0001107 Business Operation Management, 5 cr

FHA0001137 Basics of Structural Engineering 2, 4 cr

FHA0000838 Industrial utilization of waste, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään erilaisten jättemateriaalien teolliseen hyötykäyttöön, siihen liittyviin säädöksiin sekä hyödyntämisen tuloksena syntyvään liiketoimintaan. Opintojaksolla paneudutaan tuottajavastuun piirissä oleviin materiaaleihin, kuten sähkö- ja elektroniikkalaitteisiin, käytöstä poistettuihin ajoneuvoihin, käytöstä poistettuihin ajoneuvojen renkaisiin ja paperipohjaisiin materiaaleihin. Lisäksi tarkastellaan PK-yrityksen jätehuoltosuunnitelman sisältöä sekä ongelmajätehuollon järjestämistä.

Esitiedot: 17052602 Jätehuoltojärjestelmät, 17056204 Jätteiden käsittely

Yhteydet muihin opintojaksoihin: välillisiä yhteyksiä muihin kokonaisuuden ”

FHA0001138 Industrial Utilization of Waste, 3 cr

The student is able to:

The student knows the main industrial recycling possibilities of different waste materials like electronic devices, old cars and scrap tyres. The student recognizes the business opportunities in industrial waste recycling.

FHA0001139 Brush up your Finnish, 3 cr

The student is able to:

The course is intended for students who have taken the Daily, Studying and Working Finnish courses but whose Finnish skills need some serious brushing up. The major stumbling blocks of the Finnish grammar (e.g. the use of the cases and the verbs) are dealt with; the main stress is, however, on language production both orally and in writing.

The course requires a lot of independent work!

FHA0001140 Air Quality Management, 3 cr

The student is able to:

Student recognizes what kind of impurities are in the atmosphere and where these come from. Also student learns how pollutants are converted and transported in the atmosphere and what are the main impacts. Student can tell main different control measures and how these can be impacted to reduction of emissions. Student is able to describe main purification technics in air pollution field.. ,

FHA0001142 Environment Rehabilitation, 3 cr

The student is able to:

By completing the course acceptably a student

knows results of the latest assessment of the State of the Built Environment (ROTI - assessment) and is able to interpret those

knows most common problems related to built environment and also rehabilitation principles to solve and/or to mitigate those

knows most common rehabilitation alternatives and methods of closed and expendable soil, sand, gravel, etc. exploitation area

knows methods and their applications in lake, river and catchment rehabilitation

knows challenges towards the environment brought by climate change

can apply knowledge gained in different kinds of environment rehabilitation projects and is able to participate in planning and implementing such projects.

FHA0001141 International Climate Politics, 3 cr

The student is able to:

Student recognizes the back ground for climate change and is able to describe essential global consequences. Student is able to tell how climate change could be controlled on personal level and by measures of the society. Student is able to name remarkable international agreements and directives on climate change and to describe concrete measures globally into prevent climate change. Student manages the terms of emission trade.

FHA0001143 Pollution Control in Industrial Processes, 3 cr

The student is able to:

Student

Understands aims and restrictions of environmental pollution control in industry and is able to name emissions coming from main industrial field.

Learns alternative measures and finds BAT to reduce emissions before choosing suitable cleaning technology for different kind of processes.

Is able to calculate running costs for different purification technologies.

FHA0000833 Construction and Project Management, 3 cr

The student is able to:

The student knows the phases of a construction project and the typical parties involved in it. The student recognizes the roles of different parties like builder, designers and contractors. The student has learned the basic skills needed in project management and also what are the typical requirements for persons working in projects.

FHA0001144 Industrial Water Management, 3 cr

The student is able to:

The student recognizes the main principles of industrial water supply and treatment. The student knows how to use different water treatment unit processes in different industrial sectors. The student knows the basics of water supply and treatment in food, metal and forest industry sectors.

FHA0001145 Environmental and Quality Management Systems, 5 cr

The student is able to:

Management systems basing on ISO standards will be able to create, apply and develop. The main ISO standards (9001, 14001, 19001 and 10013) will be familiar as well as the documents needed. Audit process should be managed.

Prerequisites: 10111304 Basics of Environmental Engineering

FHA0001146 Environmental and Safety Risks, 3 cr

The student is able to:

Identification of risks on the basis for risk analysis will be known. Principles of both deterministic and probabilistic risk analysis will be managed. Safety management will be familiar.

Prerequisites: 10112401 Basics of Environmental Engineering

FHA0001147 Life Cycle Assessment and Product Ecodesign, 3 cr

The student is able to:

Method of standardized life cycle assessment will be learned according the requirements of ISO 14040. Tools and principles of ecological and material efficiency on product design will be familiar.

Prerequisites: 10111304 Basics of Environmental Engineering

FHA0001148 Planning of Water Supply and Sewerage Systems, 3 cr

The student is able to:

The objective of this course is to study what kind of water supply and sewerage system a municipality typically has and how the different structures are dimensioned and designed.

FHA0001149 Complementary Building Design, 4 cr

The student is able to:

Opintojakson suorittuaan opiskelija osaa noudattaa rakennuksen alkuperäistä tyylisuuntaa rakennuksen muutos- tai laajennussuunnitelmia tehdessään. Opiskelija osaa tehdä rakennuksesta käyttötarkoituksen muutossuunnitelmia, tilat ja rakenteet huomioon ottaen.

FHA0001150 Mechanics 2, 6 cr

The student is able to:

Opiskelija hallitsee palkkirakenteiden taipumien käsin laskennan erilaisilla kuormitusyhdistelmillä. Hän ratkaisee staattisesti määräämättömien rakenteiden rasitukset ja taipumat.

Opiskelija tuntee rakenteiden plastisen käyttäytymisen koskien sauva- ja laattarakenteita. Opiskelija hallitsee rakenteisiin kohdistuvan väännön ja osaa mitoittaa vääntörasituksen alaisia rakenteita ja osaa laskea rakenteisiin väännön aiheuttamat siirtymät.

FHA0001151 Realisation Plans, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa tehdä RAKENNUSTYÖSELOSTUKSEN. Selostus tehdään RT-kortin Ohjeen mukaan, RYL:iä noudattaen. Opiskelija osaa piirtää tai valita tuotekansioista rakennuksessa tarvittavat täydentävät rakennusosat, joita ovat ovet, ikkunat, kalusteet, portaat, laitteet ja varusteet. Opiskelija osaa suunnitella määräysten mukaisen muuratun tulisijan sekä valita tilaan soveltuvat pintamateriaalit (tilaseloste).

FHA0001152 Road Structures and Maintaining, 3 cr

FHA0001153 Land Use Planning, 3 cr

The student is able to:

Opintojakson suoritettuaan opiskelija tuntee maankäytön suunnittelun ja yhdyskuntarakenteen muodostumisen ja kehittämisen periaatteet, kaavajärjestelmän ja eri kaavatasojen sisällöllisen olemuksen ja keskinäisen vaikuttavuuden. Opiskelija ymmärtää maankäytön ja liikenteen sekä kunnallistekniikan keskinäisen vuorovaikutuksen ja vaikutussuhteet. Opiskelija tuntee alan lainsäädännön ja hallinnon pääperiaatteet.

Sisällön pääkohdat:

- Maankäytön suunnittelun järjestelmä, eri kaavojen rooli ja sisältö sekä yhdyskuntatekniikan kysymykset eri kaavatasoilla

- Kaavoituksen käsitteet, merkinnät ja mitoitukset
- Asemakaavan valmistelun sisällölliset vaiheet
- Asuinalueen toiminnallinen rakenne sekä kaavalliset ja liikenteelliset ratkaisut
- Kaavoitusprosessin hallinnollinen kulku
- Osallistumis- ja arviointisuunnitelma, kaavan ympäristövaikutusten arviointi
- Liikenne ja tekninen huolto kaavoituksessa
- Asuinalueen toteutuskustannusten muodostuminen ja kunnan velvoitteet

FHA0001155 Construction management, 10 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa soveltaa yleisiä rakennustuotannon suunnittelun ja ohjauksen teorian mukaisia periaatteita ja menetelmiä käytännön työtilanteissa. Opiskelija osaa laatia rakennustuotannon johtamisessa käytettäviä suunnitelmia ja asiakirjoja sekä reagoida tuotannossa ilmeneviin häiriöihin ja omaa valmiuksia korjaavien toimenpiteiden tekemiseen.

FHA0001156 Project Work, 5 cr

The student is able to:

Opintojakson suoritettuaan opiskelija on kykenevä toteuttamaan pienimuotoisen työelämän tarpeesta määritellyn kehittämishankkeen.

FHA0001154 Installations of Building Services, 3 cr

FHA0001157 Cost Estimating, 4 cr

The student is able to:

Opintojakson suoritettuaan opiskelija osaa soveltaa investointilaskennan menetelmiä rakennus- ja kiinteistöalan elinkaarilaskennassa. Opiskelija tuntee rakennushankkeiden tarjous- ja rakentamisvaiheiden kustannuslaskennassa käytettävät laskentamenetelmät. Opiskelija osaa ohjatusti siirtää 3D-tietomallista rakennusosien määrätiedot kustannuslaskentaohjelmaan ja osaa laatia asuinrakennuskohteen kustannusarvion panospohjaisia tuotantorakenteita käyttäen.

FHA0001161 Thesis, 15 cr

The student is able to:

Opinnäytetyö on kokonaisvaltainen opiskelijan itsenäisesti tekemä suunnittelu-, tutkimus- tai tuotekehitystyö, jossa hyödynnetään koulutusohjelman keskeisimpiä osa-alueita. Opinnäytetyö tehdään elinkeinoelämälle tai oppilaitokselle oppilaitoksen määräämän ohjaajan valvonnassa. Opinnäytetyön tarkoituksena on valmentaa opiskelijaa työskentelemään johdonmukaisesti ja järjestelmällisesti, etsimään ja käyttämään lähdeaineistoa, yhdistelemään opetuksen eri osa-alojen antamia tietoja, käyttämään tarkoituksenmukaisia menetelmiä, tekemään itsenäisiä ratkaisuja ja harjaantumaan hyvään kirjalliseen, kuvalliseen ja suulliseen ilmaisuun.

FHA0001169 Geotechnical Engineering, 3 cr

The student is able to:

During the course of geotechnics student will learn essential basics of soil mechanics. Student can for example draw grain size distribution curves, give name to soil samples and calculate weight-volume relationships. Student will also learn, how to define strength parameters to soil and according them student can do some basic calculations like width of footings and soil pressures.

FHA0001170 Structural Steel Design 1, 6 cr

The student is able to:

OBJECTIVES

After the course the students

- Can calculate cross section properties of open steel cross sections
- Can design unrestrained beams
- Can design columns under bending and axial force.
- Understand the plate buckling phenomenon and can calculate bending and compression resistance of cross section class 4 cross sections.
- Can design simple beam under torsion.
- Have a basic understanding of the effect of the second order effects and imperfections on structures.
- Can design simple welded and bolted connections.
- Have basic knowledge and skills to design simple beam to column and column to foundation joints.

CONTENT

Unrestrained beams (lateral buckling of beams), local buckling of thin walled elements, torsion, beam-columns, second order effects, global imperfections, design of welds, design of bolted connection, component method for designing joints.

FHA0001171 Building Physics, 3 cr

The student is able to:

Having completed the course student knows how professional, line-specific studies are related to physical science. The content of the course includes heat transfer mechanisms, especially conduction through non-homogenous structures with different cold bridges, moisture, mechanisms of moisture flow through structures, interstitial condensation. Student is able to calculate flows of these phenomena.

Prerequisites: Physics 1, Physics 2

FHA0001174 Structural Engineering 2, 3 cr

The student is able to:

The objective of this course is to provide the student with a wider knowledge and understanding of structural engineering. The course includes seminars, coursework, excursions and laboratory work. Coursework comprises the designs for portal frame buildings with concrete, timber and steel structures. In the design work, the students familiarise themselves with the use of computer-aided design programmes.

The student learns to design

- a two span in-situ concrete beam
- a concrete frame column
- a concrete portal frame : framing, cantiliver column, Hlbeam, TT-slab, pad foundation, intermediate floor structures
- a sketch design of a gluelam portal frame

FHA0001175 Structural Engineering 3, 3 cr

The student is able to:

The objective of this course is to provide the student with a wider knowledge and understanding of structural engineering. The course includes seminars, coursework, excursions and laboratory work. Coursework comprises the designs for high-rise buildings with both in-situ and prefabricated structures. In the design work, the students familiarise themselves with the use of computer-aided design programmes.

The student learns to design

- in-situ two way concrete slab
- strip foundation
- in-situ multi-storey residential house: framing, building components, connection details, bracing, in-situ two-way slab reinforcement, strip foundation design
- concrete unit multi-storey residential house: framing, building components, connection details, bracing, hollow core slab

FHA0001172 Renovation 1, 3 cr

The student is able to:

After this course student understands most common damages in several kind of buildings and he or she is able to find at least one way to repair the building.

In this course we will concentrate on detached houses and other small houses with timber- or brick frame. After this course student is able to make all the necessary construction plans to promote energy efficiency of detached houses. He or she understands how to repair the envelope of detached houses and he or she is able to take inconsideration demands of building physics.

One of the main topics in this course is that students know how to prevent effects of excessive moisture. Student understands how to increase load bearing capacity of the frame and foundations.

FHA0001176 Building Construction 3, 3 cr

The student is able to:

This course provides an understanding of the practice of the Building Construction. It builds upon the fundamental skills developed in Mechanics and Structural Engineering and presents the principles of construction methods and construction technology. The course provides a perspective for dealing with the issues of Building Process, Foundations, Building Materials, Framing, Structures, Thermal, Acoustical and Moisture Protection and Fire Engineering.

The student learns the architectural design of a two-storey concrete block residential house:

- permit drawings
- implementation drawings
- master document

FHA0001173 Renovation 2, 3 cr**The student is able to:**

In this course we will focus on multi-storey houses and office buildings and industrial houses. After this course student is able to make plans how to increase load bearing capacity of beams and columns and foundations. Students know different kind of constructions used in different kind of buildings and understand the behaviour of building frame.

In this course we concentrate on reinforced concrete frames and brick frames. After this course students are able to make changes on already existing building frames and he or she is able to make plans for temporary supports. Students know how to take inconsideration fire resistance and sound insulation when renovating old buildings.

FHA0001177 Building Services, Electrical Installations, 3 cr**The student is able to:**

Completing the course a student is able to:

- Know the electric quantities and is able to solve current, power and voltage drop in a typical direct current and single phase alternating current circuit.
- Understand the general principle and structure of distribution of electricity in a building
- Understand the general principle and structure of data communication cabling in a building
- Distinguish between different installation methods and materials
- Carry out calculations on illumination for a given room space
- Interpret most common electrical installation symbols in floor plans and circuit diagrams
- Explain the principle on creating specification for electrical installations for a domestic and commercial building.
- Evaluate tender documentation for a contract on electrical installations.

The course content is based on the recommendations in international and European standards, IEC (International Electrotechnical Commission) series 6000 standards and European series EN 6000 standards. Introduction to the general purpose communication cabling is given according to ISO/IEC 11801 and EN 50173.

FHA0001179 Structural Steel Design 2, 6 cr**The student is able to:**

CONTENTS: The course deals with properties, use and design of load-bearing cold-formed steel structures in construction engineering. The course also covers cold-formed steel structures used as cladding material in industrial, office and residential buildings. In addition, durability of steel structures, corrosion protection, different coil coatings, fastening methods of thin walled components, and steel-concrete composite structures are studied. Besides lectures, the course includes a design task and several assignments to be submitted.

OBJECTIVES: After completion of the study module, the student

is familiar with the different uses of cold-formed steel members and sheeting

understands the characteristic features related to the structural behavior of the thin-walled structures

is able to make dimensioning for a load-bearing trapezoidal sheets or purlins as well as design their joints

is familiar with coil-coatings of steel sheet metals as well as with their properties and use

understands the basic concepts related to steel corrosion and the conventional methods for corrosion protection

understands the different uses of steel-concrete composite structures as well as the basics of their structural behaviour

FHA0001181 Management and Leadership, Managing Across Cultures, 4 cr

The student is able to:

This module will consist of three integral parts:

Financial and Management Accounting

The first objective of course is designed to introduce students to the fundamental principles of business finance with particular emphasis on the profit and loss account and the balance sheet with an introduction to the techniques used to read and interpret these statements including ratio analysis.

The second objective of this course is to introduce and demonstrate the principles of management accounting and show how each technique (such as investment Benefit-Cost analysis, Net Present Value, Internal Rate of Return) can be applied to the manager's day-to-day work as well as frame of reference for thesis.

Strategy Management

This part of the module is built around the process of strategic management - the essential strategic decisions that organisations must take when creating and implementing strategies. Seven key themes which make up the crucial determinants for strategic success through to the millennium are introduced on the course. These are: adding value, core competencies and strategic capabilities, architecture and synergy, competitive advantage, strategic regeneration and strategy focused organization including Balanced Score Card approach for implementation of the strategy.

Managing Across Cultures

This part of the module is planned to develop students understanding of how culture influences management practice and how managers perceive their organizations and their careers. It raises awareness of how culture guides the way managers look at problems, the solutions they find, the way they deal with others, and how others may react. The following issues will be covered: the undertow of culture, exploring culture, interacting spheres of culture, culture and management practice, multicultural team, global organization and business ethics.

FHA0001180 Life Cycle Assessment and Product Ecodesign, 3 cr

The student is able to:

Method of standardized life cycle assessment will be learned according the requirements of ISO 14040. Tools and principles of ecological and material efficiency on product design will be familiar.

Prerequisites: 10117181 Basics of Environmental Engineering

FHA0001183 Environmental Chemistry 2, 5 cr

The student is able to:

The aim of the course is that the student can define what kind of chemical is harmful to environment and can use the chemical data-bases. The student can examine soil samples in the laboratory and can explain the reasons of soil contamination in Finland.

Prerequisites: Env. Chemistry 1

FHA0001182 Environmental Legislation 2, 3 cr

The student is able to:

The student knows the administrative procedure of environmental impact assessment and the responsibilities in environmental damage cases. The student can use Nature conservation act and Water act in permit processes and in monitoring of environment. The student can evaluate the influence of EU to legislation in Finland.

Prerequisites: Env. Legislation 1

FHA0001185 Construction and Project Management, 3 cr

The student is able to:

In this course students will learn about project management: the nature and context of project management, project life cycle, project roles project planning and organisation and management and leadership. Students will be familiar with phases of a typical Environmental Engineering project by studying project examples.

Prerequisites: Basics of Environmental Engineering, Waste Management Systems, Water Supply and Water Treatment, Waste water Treatment

FHA0001184 Planning of Water Supply and Sewerage Systems, 3 cr

The student is able to:

The objective of this course is to plan typical municipal water supply and sewerage system and understand the different structures and elements of the networks. Also theoretical background of fluid mechanics will be known.

FHA0001186 Air Quality Management, 3 cr

The student is able to:

Student

recognizes what kind of impurities are in the atmosphere and where these come from.

learn how pollutants are converted and transported in the atmosphere and what are the main impacts.

can tell main different control measures and how these can be impacted to reduction of emissions.

is able to describe main purification technics in air pollution field.

FHA0001189 Waste Treatment Processes, 3 cr

The student is able to:

In this course students will pay attention on different waste treatment processes. Main emphasis is put on biological and thermal treatment. Also some examples of using mechanical treatment in combination with recycling of materials will be studied. Students will learn the the key parameters of processes and how complete treatment facilities are built.

Prerequisites: Waste Management Systems

FHA0001188 Remediation of Contaminated Soils and Waters, 3 cr

The student is able to:

The objective of this course is to learn the typical problems concerning the lakes in Finland and on the other hand the typical reasons for contamination of soil. Students will be familiar with the main restoration methods of lakes and contaminated sites.

Prerequisites: Geology, Environmental Geology

FHA0001187 Environmental and Quality Management systems, 3 cr**The student is able to:**

Management systems basing on ISO standards will be able to create, apply and develop. The main ISO standards (9001, 14001, 19001 and 10013) will be familiar as well as the documents needed. Audit process should be managed.

Prerequisites: 10117181 Basics of Environmental Engineering

FHA0001190 Environmental Legislation 2, 3 cr**The student is able to:**

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0001191 Planning of Water Supply and Sewerage Systems, 3 cr**The student is able to:**

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0001192 Air Quality Management, 3 cr**The student is able to:**

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0001193 Waste Treatment Processes, 3 cr**The student is able to:**

Tavoite:

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat:

FHA0001203 Environmental Geology, 3 cr

FHA0001218 Finite Element Methods for Mechanical Engineers, 5 cr

The student is able to:

The student will become familiar with the basics of finite element methods (FEM) and will be able to apply these methods using commercial programs in static and dynamic analysis. Having completed this course, the student can use ready-made software to solve problems in the statics and dynamics of linear, surface and solid structures. The student can identify the possible causes of error in the element method, and can analyse results and their accuracy.

FHA0001293 Applied Electronics, 5 cr

The student is able to:

Having completed this course, the student understands the usefulness of micro-controllers in automation control and in small, soldered systems. The student can make programmes for Stamp II and PIC controllers. The course also provides skills in the design of circuit boards and the production of a simple device.

FHA0001495 Identification Techniques, 4 cr

FHA0001496 Transportation Equipment and Telematics, 5 cr

FHA0001501 Supply Chain Management, 4 cr

The student is able to:

Opiskelija:

- ymmärtää toimitusketjut järjestelminä, sekä tietää alan nykyiset trendit ja kehityssuuntaukset
- hahmottaa liiketoimintaympäristön globalisoitumisen vaikutukset toimitusketjunhallinnalle
- ymmärtää asiakkaalle tuotetun lisäarvon ja kilpailukyvyn välisen yhteyden toimitusketjunhallinnan näkökulmasta katsottuna
- tietää toimitusketjujen suunnitteluun ja ohjaamiseen liittyvät peruskysymykset ja menetelmät

FHA0001502 Procurement, 4 cr

The student is able to:

Opiskelija:

- ymmärtää hankintatoimen merkityksen sekä yrityksen että toimitusketjun toiminnalle ja tuntee alan nykyiset trendit
- omaa valmiudet punnita make-or-buy -päätöksiä, ja tunnistaa ulkoistamisen, ydinosaamisen ja alihankinnan käsitteet
- hallitsee hankintaprosessin eri vaiheet ja pystyy toteuttamaan näitä myös käytännössä
- osaa analysoida ja kehittää hankintatointa erilaisten menetelmien kautta
- ymmärtää erilaiset hinnoittelu- ja neuvottelumenetelmät
- sisäistää toimittajien hankintaan ja valintaan liittyvät tekijät, sekä ymmärtää miten toimittajien suorituskykyä voidaan seurata

FHA0001503 Fieldbus Technology, 3 cr

The student is able to:

Students know process automation fieldbuses and the configuration methods of fieldbuses in automation systems.

Students can analyze error diagnostics in connection with bus devices, know most important installation issues and design of field segments.

FHA0001504 Thesis, 15 cr

The student is able to:

Opinnäytetyö on kokonaisvaltainen oppilaan itsenäisesti tekemä suunnittelu-, tutkimus- tai tuotekehitystyö, jossa hyödynnetään koulutusohjelman keskeisimpiä osaalueita. Opinnäytetyö tehdään elinkeinoelämälle tai oppilaitokselle oppilaitoksen määräämän ohjaajan valvonnassa.

Opinnäytetyön tarkoituksena on valmentaa opiskelijaa työskentelemään johdonmukaisesti ja järjestelmällisesti, etsimään ja käyttämään lähteaineistoa, yhdistelemään opetuksen antamia tietoja, käyttämään tarkoituksenmukaisia menetelmiä, tekemään itsenäisiä ratkaisuja ja harjaantumaan hyvään kirjalliseen, kuvalliseen ja suulliseen ilmaisuun.

FHA0001505 Control Engineering, 4 cr

The student is able to:

Students know the unit processes used in process technology and the operation of closed loop control both on the time domain and frequency domain, Laplace basis. They can do the tuning of a PID controller. Students know the basics of digital signal processing such as digital filtering, signal linearization and the digital PID algorithm.

FHA0001506 Maintenance Economics, 4 cr

The student is able to:

Tuition in Finnish language: Opiskelijalla on kokonaisnäkemys tuotantolaitoksen kunnossapidon taloudellisesta merkityksestä ja kunnossapidon tunnusluvuista.

FHA0001507 Maintenance Information Systems, 4 cr

The student is able to:

Tuition in Finnish language: Opiskelija osaa käyttää kunnossapitotöiden hallintajärjestelmiä ja automaattisia koneseurantaohjelmistoja sekä tietää niiden liitännät ohjausjärjestelmiin. Opiskelija osaa toteuttaa kunnossapidon tietojärjestelmien käyttöönottoja.

FHA0001508 Maintenance Project Work, 3 cr

The student is able to:

Tuition in Finnish language: Opiskelija osaa toteuttaa tehokkaan tuotannon tarvitseman sovelluksen kehittämällä yrityksen kunnossapitoon liittyviä toimintoja ja automaatiota. Opiskelija osaa tehdä kunnossapitoon liittyvän projektin ryhmätyönä todelliseen kohteeseen. Opiskelija hallitsee projektityöskentelyn käytännöt siihen liittyvine kokouksineen ja raportteineen.

FHA0001514 User Interface Design and Usability Evaluation, 4 cr

FHA0001034 Future of Food Industry, 5 cr

FHA0000792 Environmental Geology, 3 cr

The student is able to:

This course is designed to introduce the student to the main areas of Environmental Geology. After the course student knows methods of soil and groundwater protection and has a good knowledge of geological and hydrogeological resources and of soil and groundwater protection.

FHA0001044 Maintenance Project, 3 cr**The student is able to:**

Student knows how to apply the acquired knowledge towards efficient production through developing the maintenance operations of a company. Student knows reliability planning and can finalize independently an extensive maintenance project in an industrial setting. Student knows how to manage small scale maintenance projects - as well as knows how to conduct meetings and reports related to these.

FHA0001045 Graduation Thesis, 15 cr**The student is able to:**

The thesis is a comprehensive and independent design, research or development work/project/study where a student shows to be capable of working at the most essential fields of Automation Engineering degree programme. The thesis is done mainly for industrial life, occasionally also for the Automation Engineering degree programme and always under supervision of an instructor. In addition, the thesis comprises participation in supervision sessions in groups and individually, required seminars and public examination. The purpose of the thesis is to prepare the student to work logically and systematically, to search for and use reference materials, to combine theoretical knowledge, to use appropriate methods, to get practice in producing scientific text and graphics, and to improve his/her oral presentation skills.

FHA0001178 Building Services, HVAC, 3 cr**The student is able to:**

Student

Is able to describe water supply and sewerage systems of a house and knows basics of dimensioning of it in accordance with building codes.

Understands common heating systems and function of central water heating and is able to calculate heat loss of buildings.

Realizes and is able to compare different air conditioning systems of buildings and its controls.

FLM0000987 Automation Design Basics, 6 cr**FLM0000988 Physics Basics, 3 cr****FLM0000989 Machining and Welding Basics, 3 cr****FLM0000990 Mathematics Basics, 3 cr****FLM0000991 Mechanical Design Basics, 5 cr****FLM0000992 Orientation Studies, 3 cr****FLM0000993 Electrical Engineering and Electronics Basics, 3 cr****FLM0000994 Technical Drawing, 4 cr****FLM0000995 Supplementary studies in Finnish, 3 cr**

FLM0000996 Data acquisition systems and modular logics, 4 cr

FLM0000997 Quality engineering, 4 cr

FLM0000998 Project 1, 5 cr

FLM0000999 Designing plastic products, 2 cr

FLM0001000 Project 4, 5 cr

FLM0001001 Plastic composites, 3 cr

FLM0001002 Project 3, 5 cr

FHA0001518 Hydraulics and Pneumatics in Automation, 4 cr

The student is able to:

Opiskelija tuntee hydraukliikan ja pneumatiikan terminologian. Opiskelija osaa arvioida pneumaattisten ja hydraulisten toimilaitteiden käytettävyyttä ja säätöominaisuuksia. Opiskelija osaa suunnitella pneumaattisiin ja hydraulisiin toimilaitteisiin perustuviasäätöpiirejä.

FHA0001519 Enterprise Resource Planning System, 5 cr

The student is able to:

Opiskelija ymmärtää organisaation sisäisen tehokkaan ja järjestelmäperusteisen tiedonhallinnan perusteet. Opiskelija hahmottaa SAP ERP -järjestelmän perusrakenteen ja moduulien välisen integraation sekä osaa laatia sovelluksen toiminnanohjausjärjestelmällä.

FHA0001517 Pneumatiikka ja hydrauliikka, 3 cr

The student is able to:

Opiskelija tuntee hydraukliikan ja pneumatiikan terminologian. Opiskelija osaa arvioida pneumaattisten ja hydraulisten toimilaitteiden käytettävyyttä ja säätöominaisuuksia. Opiskelija osaa suunnitella pienimuotoisia pneumaattisiin ja hydraulisiin toimilaitteisiin perustuvia säätöpiirejä.

FLM0001003 Physics for information technology, 4 cr

FLM0001004 Physics for mechatronics, 5 cr

FLM0001005 Strength of Materials, 3 cr

FLM0001006 Programming Basics (C language), 3 cr

FLM0001007 Continuation course in electrical design (safety engineering), 3 cr

FLM0001008 Field Buses and HMI Systems in the PLC Environment, 3 cr

FLM0001009 Plant layout planning 1, 3 cr

FLM0001010 Position control, 4 cr

FLM0001011 Pneumatics, 3 cr

FLM0001012 Mechanical design 2, 5 cr

FLM0001013 Personnel, 3 cr

FLM0001014 Energy and maintenance, 4 cr

FLM0001015 Strength of materials 3, 3 cr

FLM0001017 Product design 3D modelling, 3 cr

FLM0001018 Supervised training 2, 12 cr

FLM0001019 Hydraulics 2, 2 cr

FLM0001020 Accounting and purchasing, 2 cr

FLM0001021 Marketing, 2 cr

FLM0001022 Mechanical design 3, 4 cr

FLM0001023 Mechanical design 4, 3 cr

FLM0001024 Measuring techniques and troubleshooting, 2 cr

FLM0001025 Material and manufacturing technology 2, 2 cr

FLM0001026 Material and manufacturing technology 3, 3 cr

FLM0001027 ThesisThesis, 15 cr

FLM0001028 Patents, design, 2 cr

FLM0001029 CAM, 3 cr

FLM0001030 Production control, 3 cr

FLM0001031 Supplementary studies in English, 3 cr

FLM0001032 PC control methods, 3 cr

FLM0001033 English for media technology, 3 cr

FLM0001034 Spoken English, 3 cr

FLM0001037 Swedish, 3 cr

FLM0001038 Hazardous materials, 5 cr

FLM0001039 Water and waste water treatment, 5 cr

FLM0001040 Land and Water Ecosystems, 6 cr

FLM0001041 Learning and Professional Growth, 2 cr

FLM0001043 User interface programming, 5 cr

FLM0001044 Application development workshop, 5 cr

FLM0001045 Image Processing, 3 cr

FLM0001046 Basics of Databases, 3 cr

FLM0001047 Object Oriented Programming, 4 cr

FLM0001048 Environmental ICT project 3, 3 cr

FLM0001049 National and International Development Cooperation, 5 cr

FLM0001050 Working and communication in developing countries, 5 cr

FLM0001071 Application of environmental legislation, 3 cr

FHA0001046 Basics of Enterprises Resource Planning Systems - SAP, 4 cr

The student is able to:

The student understands the fundamentals of internal, efficient and system based data management used in company organization. The student can piece together the basic structure of SAP software and the integration between modules.

FHA0001547 Multicultural Leadership, 3 cr

The student is able to:

This course aims at preparing engineering students to effectively lead themselves and others in modern, diverse organizations. Students explore the importance of self-efficacy for personal and professional success, analyze their skills, and prepare leadership development plans. Students also examine the role and value of leaders in technical organizations and define the responsibilities of managers in achieving results through people.

FHA0001550 Development Project - Engineering (FUAS Innovation School), 9 cr

The student is able to:

A working life project is an engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0001556 Special Issues In Food industry, 3 cr

The student is able to:

Opiskelijaoppii analyttisen sekä tutkivan työskentelytavan elintarvikealan kehittämisessä sekä tuntee elintarvikealan keskeisimmät alan erityiskysymykset.

FHA0001555 Consumer Behavior In Food Industry, 3 cr

The student is able to:

Opintojakson tavoitteena on perehtyä kuluttajakäyttäytymisen perusperiaatteisiin sekä elintarviketoimialan kuluttajakäyttäytymisen erityispiirteisiin.

FHA0001554 Nutrition In Food Industry, 3 cr

FLM0001164 Co-designing Better Urban Living, 5 cr

FHA0001333 Basics of Physics in Construction, 3 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia

FLM0001166 Environmental Project, 6 cr

FLM0001165 Thesis, 15 cr

FLM0001168 Visualization workshop II, 5 cr

FLM0001169 Game Programming Essentials, 5 cr

FLM0001170 Green ICT Systems Project, 4 cr

FLM0001171 Radio systems, 4 cr

FLM0001172 Radio technology and radio links , 4 cr

FLM0001173 Research work, 5 cr

FLM0001175 Data structures and algorithms, 3 cr

FLM0001176 Programmable circuits, 4 cr

FLM0001177 Networking Fundamentals, 5 cr

FLM0001178 Green ICT Systems Project, 4 cr

FLM0001180 Applied ICT mathematics, 3 cr

FLM0001181 Software architectures, 5 cr

FLM0001182 Software development project, 3 cr

FLM0001183 Microprocessors in embedded systems, 4 cr

FLM0001184 Research project in telecommunications technology, 5 cr

FLM0001185 Network management systems, 4 cr

FLM0001186 Electricity and wave motion, 3 cr

FLM0001187 Scientific Writing, 2 cr

FLM0000733 Research process and research methods, 5 cr

FLM0001188 Master's Thesis, 30 cr

FHA0001553 Food Security and Food Safety, 3 cr

FLM0001189 Entrepreneurship and innovation, 3 cr

FHA0001563 Traffic Safety and Psychology, 5 cr

The student is able to:

Tämä teema on osa LI03 Liikenne ja maankäyttö moduulia

FHA0001564 Basics of Urban Planning, 5 cr

The student is able to:

Tämä teema on osa LI03 Liikenne ja maankäyttö moduulia

FHA0001565 Basics of Road Design, 5 cr

The student is able to:

Tämä teema on osa LI03 Liikenne ja maankäyttö moduulia

FHA0001566 Tools for Project Work (FUAS Innovation School), 6 cr

The student is able to:

Project is a tool and way of organising work to get a specific work done. Project is often used to deliver change in organisation, develop a new product, search new opportunities, lead and manage change. Learning objectives: student can define, plan, evaluate project and express it to others, student is able to define information seeking methods, use them and classify different information sources.

FHA0001567 Tools for Business Concepts (FUAS Innovation School), 3 cr

The student is able to:

Developing a viable business product and service is a user and customer centric process wherein practical tools are applied and business hypothesis tested. Learning objectives are: student can commercialise idea, segment customer groups, design value proposition, design a solution, design business model with financial projections, identifying business model environment, and evaluate conditions of profitable product and business.

FHA0001568 Development Project - Mechanical Engineering (FUAS Innovation School), 9 cr

The student is able to:

A working life project is a mechanical engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0001569 Traffic Planning Project - Traffic (FUAS Innovation School), 9 cr

FHA0001570 Software Development Project - Information Technology (FUAS Innovation School), 9 cr

FHA0001572 Advanced Development Project - Engineering (FUAS Innovation School), 12 cr

FLM0001191 Project on improving energy efficiency, 3 cr

FLM0001192 Life cycle and material efficiency project, 3 cr

FHA0001573 Advanced Development project - Mechanical Engineering (FUAS Innovation School), 12 cr

The student is able to:

Advanced Development project - Mechanical Engineering (FUAS Innovation School), 12 cr is designed only for students who have already participated for FUAS Innovation School in year 2014.

During this course student learns to take responsibility for project management and projects systematic organisation. Students learn to solve more advanced topics on their own field. Student recognize, predict and is able to solve typical characteristics and challenges when carrying through a project. The key themes are project management, problem solving and responsibility.

A working life project is a mechanical engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

FHA0001574 Advanced Traffic Planning Project - Traffic (FUAS Innovation School), 12 cr

The student is able to:

Advanced Liikennesuunnitteluprojekti - Liikenneala (FUAS Innovation School), 12 op kurssi on tarkoitettu opiskelijoille, jotka ovat jo osallistuneet edellisenä vuonna FUAS Innovation School kokonaisuuteen.

Opintojen aikana opiskelija oppii ottamaan vastuuta projektijohtamisesta ja projektin suunnitelmallisesta organisoinnista. Opiskelija oppii ratkaisemaan oman alansa haastavia aiheita. Opiskelija tunnistaa, ennustaa ja pystyy ratkaisemaan tyypillisiä ominaispiirteitä ja haasteita projektin läpiviennissä sekä sen sisällössä. Keskeisiä teemoja ovat projektinhallinta, ongelmanratkaisu ja projektin itsenäinen läpivienti.

Työelämäprojekti on ulkopuolisille toimeksiantajille tehtävä suunnittelu- tai tutkimusprojekti, joka toteutetaan useimmiten ryhmätyönä. Pedagogisena lähtökohtana on tutkiva oppiminen.

Opiskelija oppii ottamaan huomioon suunnittelutehtäviin liittyviä ulkopuolisia rajoituksia ja vaatimuksia. Hän tuntee

liikennesuunnittelun metodologiaa ja ymmärtää suunnitteluprosessiin läpiviennin sen eri välivaiheineen.

FHA0001575 Advanced Software Development Project - Information Technology (FUAS Innovation School), 12 cr

The student is able to:

Advanced Ohjelmistokehitysprojekti - Tietotekniikka (FUAS Innovation School), 12 op kurssi on tarkoitettu opiskelijoille, jotka ovat jo osallistuneet edellisenä vuonna FUAS Innovation School kokonaisuuteen.

Opintojen aikana opiskelija oppii ottamaan vastuuta projektijohtamisesta ja projektin suunnitelmallisesta organisoinnista. Opiskelija oppii ratkaisemaan oman alansa haastavia aiheita. Opiskelija tunnistaa, ennustaa ja pystyy ratkaisemaan tyypillisiä ominaispiirteitä ja haasteita projektin läpiviennissä sekä sen sisällössä. Keskeisiä teemoja ovat projektinhallinta, ongelmanratkaisu ja projektin itsenäinen läpivienti.

Opintojaksolla perehdytään ohjelmistotuotantoon käytännössä määrittelemällä, suunnittelemalla ja toteuttamalla asiakkaan toimeksiannon mukainen ohjelmistotuote. Asiakkaana voi olla ulkopuolinen taho, yritys, toinen opiskelija/opiskelijaryhmä tai oppilaitoksen sisäinen intressiryhmä (esim. toinen koulutusohjelma).

Opintojakson aikana opiskelija oppii käytännössä ohjelmistokehitysprosessissa tarvittavia taitoja kuten projektityöskentelyä, suunnittelua, dokumentointia, tiimityötä, kuvausmenetelmiä, vaihejakomalleja sekä ohjelmistotuotteen kehittämisessä tarvittavia tekniikoita, ohjelmointikieliä, sovelluskehittämiä yms. Opintojakson pedagogisena lähtökohtana on ongelmalähtöinen, tutkiva oppiminen.

FLM0001208 3D printing, 3 cr

FLM0001204 Communicating Your Expertise, 3 cr

FLM0001205 PLC-programming (Siemens), 3 cr

FLM0001197 Physics Labs, 3 cr

FLM0001209 Environmental legislation, part 1, 3 cr

FLM0001210 Environmental legislation, part 2, 2 cr

FHA0001578 Development Project - Construction Engineering (FUAS Innovation School), 9 cr

The student is able to:

A working life project is an engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FLM0001214 Co-designing Better Urban Living, 5 cr

The student is able to:

Student Learning Outcomes: © ©Knowledge ©- use professional concepts consistently and to be capable to discuss and communicate professional issues in interdisciplinary and international group ©- take account the nature and urban environment as a resource of health and wellbeing © ©Skills ©- analyze the initial situation and the needs of a client or a business partner ©- present alternative solutions and adapt the professional skills to the service design of the work life partner ©- choose suitable methods and explain the reasons for these solutions © ©Team work ©- act with situational awareness ©- plan and arrange the activities with the ethical principles of one's own professional field ©- organize interdisciplinary and international team work according to team's professional goals © ©Suitable for Bachelor and Master degree students interested in environmental issues with either technical, business, design or social and health care background.

FLM0001215 Information Literacy, 1 cr**FHA0001600 Fluent Finnish, 5 cr****The student is able to:**

Sujuvaa suomea -kurssi on valinnainen kurssi. Se on tarkoitettu suomen opiskelijoille, jotka jo hallitsevat peruskieliopin ja -sanaston hyvin. Kurssilla opiskellaan kirjoitettua ja puhuttua suomea monipuolisesti: siellä keskustellaan ajankohtaisista aiheista sekä kirjoitetaan ja luetaan erilaisia asiatekstejä. Kielioppiakaan ei unohdeta, vaan kurssilla tulevat tutuiksi esimerkiksi monikon genetiivi, partitiivi ja predikatiivi, adjektiivien ja adverbien vertailuasteet sekä verbien rektiot, infinitiivit ja partisiiipit.

Tavoitteena on saavuttaa YKI 4 -tasoa vastaavat tiedot ja taidot. Kurssi pidetään kokonaan suomeksi!

FHA0001602 Basic Course in Russian 1, 3 cr**The student is able to:**

Opiskelija osaa viestiä venäjän kielellä yksinkertaisissa vuorovaikutustilanteissa. Hän ymmärtää selkeää yksinkertaista puhuttua ja kirjoitettua yleiskieltä. Opiskelija hallitsee joitakin venäjän kielen perusrakenteita ja keskeistä sanastoa. Hän osaa kielen ääntämisen perusteita. Hän tuntee kohdemaan tapakulttuuria. Tavoitetasona on eurooppalaisen viitekehyksen tasoa A1 (kehittyvä alkeiskielitaito) vastaava osaaminen.

FHA0001601 Communication skills in Working German, 3 cr**The student is able to:**

Opiskelija saa valmiuksia selvittää yleisimmistä työelämän kommunikaatiotilanteista sekä suullisesti että kirjallisesti saksan kielellä.

Esitiedot: työelämän saksan perusteet tai vastaavat tiedot ja taidot.

FHA0001603 Basic Course in Russian 2, 3 cr**The student is able to:**

Opiskelija selviytyy venäjän kielellä yksinkertaisissa työelämänkin vuorovaikutustilanteissa sekä suullisesti että kirjallisesti. Hän osaa käyttää venäjän kielen perusrakenteita ja keskeistä sanavarastoa. Hän osaa ääntää kohdekieltä pääosin ymmärrettävästi. Hän omaa tietoa kohdemaan tapakulttuurista. Tavoitetasona on eurooppalaisen viitekehyksen taitotasoa A1 (toimiva alkeiskielitaito) vastaava osaaminen.

FHA0001604 Basics of Nutrition, 3 cr

The student is able to:

Opintojakson tavoitteena on perehtyä ravinnon ja terveyden yhteyksiin, uusimpiin ravitsemussuosituksiin, ravintoaineiden ja elintarvikkeiden merkitykseen ravitsemuksessa huomioiden elintarviketeollisuuden erityispiirteet.

FLM0001270 Improving Energy Efficiency - Project, 3 cr

FLM0001271 Rural Water Resources Management, Remediation and Construction, 3 cr

FLM0001272 Energy Production and Renewable Energy, 6 cr

FLM0001273 Swedish, written, 1.5 cr

FLM0001274 Swedish, spoken, 1.5 cr

FLM0001275 Built Environment and Communities, 4 cr

FLM0001278 Professional English, 3 cr

FLM0001279 Field Work, Measurements and Site Supervision, 3 cr

FLM0001280 Waste water treatment and its utilization, 3 cr

FLM0001281 Chemistry and Laboratory Analysis in Environmental research, 3 cr

FLM0001282 Mathematical Statistics 2, 3 cr

FLM0001283 Digital Technology Basics, 3 cr

FLM0001284 Hydraulics Basics, 3 cr

FLM0001285 Physics for Mechatronics, 3 cr

FLM0001286 Mechanical Design Advanced Course, 3 cr

FLM0001287 Measuring and Control Technology Basics, 3 cr

FLM0001288 Material and Manufacturing Technology Basics, 4 cr

FLM0001289 Materials and Manufacturing Technology Advanced Course, 3 cr

FLM0001290 Project Course 1, 9 cr

FLM0001291 Project Course 2, 7 cr

FLM0001292 Project 4, 8 cr

FLM0001293 Positioning Control, 3 cr

FLM0001294 Pneumatics Basics, 3 cr

FLM0001295 Robotics Basics, 3 cr

FLM0001296 Electric Motor Drives, 5 cr

FLM0001297 Basics of control engineering, 2 cr

FLM0001298 SolidWorks Basics, 3 cr

FLM0001299 Manufacturing methods, 3 cr

FLM0001300 Project 3, 7 cr

FLM0001301 Energy Efficiency, 3 cr

FLM0001302 Material Efficiency, Recycling and Waste Management, 3 cr

FLM0001303 Environmental Issues in the Management and Environmental Quality Systems, 3 cr

FLM0001304 Environmental Legislation Concerning Companies, 3 cr

FLM0001305 English for wood technology, 3 cr

FLM0001306 Surface finishing, 3 cr

FLM0001307 Designing wood constructions, 4 cr

FLM0001308 Joinery technology, 3 cr

FLM0001309 Plywood technology, 3 cr

FLM0001310 Custom-made patterns and 3D modelling, 3 cr

FLM0001311 Structures and manufacture of special clothing , 3 cr

FLM0001312 Writing reports and abstracts, 3 cr

FLM0001314 Differential and Integral Calculus, 3 cr

FLM0001315 Physics labs, 3 cr

FLM0001316 Geometry and Trigonometry, 3 cr

FLM0001323 3D-CAD Design, 3 cr

FLM0001327 Vectors and Matrices, 3 cr

FLM0001329 CNC and CAM Technology, 5 cr

FLM0001332 Board technology, 3 cr

FLM0001336 Drying and Heat Treatment of Wood, 3 cr

FLM0001277 Residential Environments Project, 5 cr

FLM0001342 Product development project in the clothing industry, 3 cr

FLM0001313 Life Cycle Analysis, 3 cr

FHA0001608 Entrepreneurship-attitude and action, 3 cr

The student is able to:

Entrepreneurship is individual's ability to use her/his opportunities. Entrepreneurial individual's knowledge, skills and attitudes effect to entrepreneurial process. Entrepreneurial activities and entrepreneurship are based on seeking, recognizing and exploiting entrepreneurial opportunities. Entrepreneurial opportunities are exploited by business ideas and business models geared towards user and customer needs.

Student can

- search, recognize and assess business opportunities
- create business ideas and evaluate idea's interest
- act in entrepreneurial way
- project business idea's financial dimensions
- present and sell business idea for different target groups

FHA0001609 Quality Management and control, 5 cr

The student is able to:

oOpintojaksolla käydään lävitse laatuun liittyvät keskeiset käsitteet ja kehitysvaiheet omaan alaan soveltaen. Tärkeänä osana opintojakson suorittamisessa on pienimuotoinen laatuprojekti, jossa perehdytään laadun hallintaan ja kehittämiseen. Lopuksi opintojaksolla myös tutustutaan laatuun liittyviin hallinnollisiin ja teknisiin standardeihin liittäen nämä omaan opintoalaan.

oOpiskelija osaa:

,-tarkastella laatua kriittisenä osana oman organisaationsa toimintaa

,-määritellä laadunvarmistamiseen liittyvät käytänteet

,- kehittää tuotteiden ja palveluiden laatua kokonaisvaltaisesti

,-hallinnoida organisaationsa toimintaan liittyvää laatuja järjestelmää ja standardeja

FHA0001610 B2B-marketing and sales, 5 cr

The student is able to:

Student will get familiar with the market behaviour of his/her own business field - as well as the segmentation and competition. Student gets familiar with the different elements in competition and understands different marketing solutions. This course is suitable for all students in all degree programmes - the subject specific knowledge will be obtained by doing tasks in your own field.

oThe students:

-Knows how to obtain relevant information for marketing and sales activities

-Understands the importance of market communication to facilitate sales

-Understands the specialities of B-to-B marketing and sales - such as defining the customer needs and building product specification

-Can handle ordinary sales negotiations

-Can select the suitable marketing and sales channels as per the customer type

-Understands by which means to compete in the market

-Understands the possibilities offered by the customer management systems

FHA0001611 Leading organization and related finance, 5 cr

The student is able to:

Opintojaksolla opiskelija saa kokonaiskäsityksen organisaation yleisjohtamisen kokonaisuudesta ja siihen liittyvästä yritystalouden kokonaisuudesta. Opiskelija osaa tunnistaa johtamisen eri osa-alueet, henkilöstöjohtamisen kehitysvaiheet, osaa erottaa johtamistyylien keskeisimmät piirteet. Opiskelija osaa strategisen johtamisen peruseriaatteen ja kehitysvaiheet sekä käsittää strategisen henkilöstöjohtamisen lähtökohdat. Opiskelija osaa implementoida yrityksen vision strategiseksi päämääräksi ja osaa yhdistää tavoiteasetannan osaksi henkilöstöjohtamista.

FLM0001276 Community Planning /LAMK - Lahti UAS, 5 cr

FLM0001317 Management, 3 cr

FLM0001318 Strength of Materials 1, 3 cr

FLM0001319 Thermology, 3 cr

FLM0001320 Mechanics, 3 cr

FLM0001321 Material Science Basics, 5 cr

FLM0001322 Electrical Engineering and Automation, 3 cr

FLM0001324 Industrial automation 2, 4 cr

FLM0001325 Scientific Writing, 1 cr

FLM0001326 Technical Drawing Basics, 3 cr

FLM0001328 Business economics, 2 cr

FLM0001330 Furniture Technology, 4 cr

FLM0001331 Cost calculation, 3 cr

FLM0001333 Gluing Techniques, 3 cr

FLM0001334 Gluing techniques, 3 cr

FLM0001335 Surface Treatment, 3 cr

FLM0001337 Project 2 – Product Development Project, 5 cr

FLM0001338 Woodworking and Production Technology, 4 cr

FLM0001339 Production and Processing of Sawn Goods, 3 cr

FLM0001340 Technical construction timber products, 3 cr

FLM0001341 Plant layout planning, 3 cr

FLM0001343 Finishing and Jointing, 3 cr

FLM0001344 Properties and Testing Them, 5 cr

FLM0001345 Polymer Chemistry, 3 cr

FLM0001346 Product Development Project, 4 cr

FLM0001347 Product Design, 3 cr

FLM0001348 Product Development and Research Project, 4 cr

FLM0001349 Manufacturing Technology, 5 cr

FLM0001350 Smart Materials, 3 cr

FLM0001351 Business Mathematics, 3 cr

FLM0001353 Sustainable Development and Energy Efficiency in Remediation (in situ methods), 3 cr

FLM0001354 Urban Water Resources Management and Project, 6 cr

FLM0001355 Remediation Process, 3 cr

FLM0001356 STREET AND ROAD PLANNING, 5 cr

FLM0001357 TRAFFIC SAFETY AND PSYCHOLOGY, 5 cr

FHA0001612 Industrial Marketing and Purchasing Solutions, 5 cr

FHA0001354 Geotechnics, 3 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia

FHA0001357 English for Construction Managers, 3 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia

FHA0001351 Project, 4.5 cr

The student is able to:

Tämä teema on osa Mestariopiskelijaksi kasvu -moduulia

FHA0001616 Construction industry and economics, 1 cr

The student is able to:

Tämä teema on osa Mestariopiskelijaksi kasvu -moduulia (alkaen vuodesta 2015)

FHA0001617 Architecture and Construction, 2 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia (vuodesta 2015 alkaen)

FHA0001618 Building Materials, 2 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia (vuodesta 2015 alkaen)

FHA0001347 Studying in HAMK, 3 cr

The student is able to:

Tämä teema on osa Mestariopiskelijaksi kasvu -moduulia

FHA0001619 Development Project - Engineering (FUAS Innovation School), 3 cr

The student is able to:

A working life project is an engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0001620 Advanced Development project - Engineering (FUAS Innovation School), 4 cr

The student is able to:

Advanced Development project - Engineering (FUAS Innovation School), 12 cr is designed only for students who have already participated for FUAS Innovation School in year 2014.

During this course student learns to take responsibility for project management and projects systematic organisation. Students learn to solve more advanced topics on their own field.

Student recognize, predict and is able to solve typical characteristics and challenges when carrying through a project. The key themes are project management, problem solving and responsibility.

A working life project is a mechanical engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

FHA0001356 Basics in Construction Chemistry, 3 cr

The student is able to:

Tämä teema on osa Rakentamisen perusteet -moduulia

FHA0001348 Occupational Safety, 3 cr

The student is able to:

Tämä teema on osa Mestariopiskelijaksi kasvu -moduulia

FHA0001623 Production planning & control, 5 cr

The student is able to:

The course focuses on the methods and tools to plan the production of services and items. The role of the production organization will be discussed as well. The student will have a chance to carry out these studies in a flexible manner in terms of schedules.

The student can:

create demand forecasts to be used as a basis for production planning

create the most essential production plans and assess the feasibility of these

view and manage production as a part of an organization

carry out the basic tasks of a production supervisor

FHA0001624 Process Management, 5 cr

The student is able to:

Opintojaksolla käydään lävitse prosessien kehittämisen ja johtamisen perustaitoja. Tavoitteena on oppia soveltamaan yleisiä prosessikehityksen periaatteita oman oppialan toimintoihin.

Opiskelija osaa:

suunnitella ja johtaa toimintoja prosesseina

kuvantaa, analysoida ja kehittää oman alansa liiketoimintaprosesseja tavoitteellisesti

hyödyntää Lean -ajattelua prosessien kehittämisessä

laatia toiminnoille tavoitteita ja mitata tavoitteiden saavuttamista

FHA0001625 Supply Chain Management, 5 cr

The student is able to:

Essential concepts related to supply chain management will be discussed during this course. An important focus within the course is to learn to improve networked business operations in an integrated manner, while taking into account the needs of customers and other supply chain partners. Parts of the course are targeted to the students own field of study.

The student can:

view and analyze operations in a customer-centric manner in a networked business environment

create and maintain partnerships within the supply chain network

positively influence integration between supply chain partners

manage supply chain risks

FHA0001627 Purchasing, 5 cr

The student is able to:

This course includes the whole picture of procurement as a part of company line of business. Concepts revealed will be applied on the student's field of business. A major part of the delivery of the course is to search knowledge on student's field of business and to work out assignments related on company or on public procurement.

The students:

understands the role of procurement in the company's business

can relate procurement of the organization to its size of business

will know the phases of typical purchasing process: defining object of tendering, contract terms to be applied, timetables, comparison of offers, selection of the suppliers or contractors, announcements, and know how to deal with possible reclamations and other obligations during guarantee period.

Understands how to develop procurement processes, choices and possibilities of innovative procurement

Understands the main principles of public procurement, threshold values and significance of renewing laws of public procurement in different fields of business

can apply most important data bases for public procurement

understands the purchase contract structure including the terms of delivery and payment terms

FHA0001628 Service Business B2B, 5 cr

The student is able to:

Kurssilla käsitellään B2B -palveluliiketoimintaa ja sen erityispiirteitä.

Opiskelija:

Ymmärtää mitä on palveluliiketoiminta

Osaa määritellä, tuotteistaa ja kaupallistaa palvelutuotteita

Ymmärtää palvelutuotteiden hinnoittelun periaatteet

FHA0001629 Basics of business operations, 3 cr

The student is able to:

Business consists of entrepreneurial team, products and services, resources, customers and business environment in different phases of business planning, execution, assessment and development. Business development is analytical preparation for starting and developing business.

Student can

- recognize business functions and business environment factors: market, industry, trends and macro-economics
- analyse effects of business environment factors on business
- plan and evaluate profitable business and prerequisite
- can choose relevant company form
- can establish an enterprise in industry sector of own interest

FHA0001631 Tools for Project Work (FUAS Innovation School), 3 cr

The student is able to:

Project is a tool and way of organising work to get a specific work done. Project is often used to deliver change in organisation, develop a new product, search new opportunities, lead and manage change. Learning objectives: student can define, plan, evaluate project and express it to others, student is able to define information seeking methods, use them and classify different information sources.

FHA0001633 Development Project - Mechanical Engineering (FUAS Innovation School), 12 cr

The student is able to:

A working life project is a mechanical engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0001634 Traffic Planning Project - Traffic (FUAS Innovation School), 12 cr

FHA0001635 Software Development Project - Information Technology (FUAS Innovation School), 12 cr

FHA0001636 Development Project - Engineering (FUAS Innovation School), 12 cr

FHA0001637 Development Project - Construction Engineering (FUAS Innovation School), 12 cr

The student is able to:

A working life project is an engineering development project commissioned by an external organisation. Key to the performance of the project is teamwork, in which students form small groups to address development-related challenges set by the project commissioners. The pedagogical starting point is research-based learning.

The student learns to take into account external limitations and requirements related to the design tasks. He/she knows about design methodology and understands how to carry through a design process with its different intermediate stages.

During this course, the student gets to know about project-based work, its systematic organisation and management. The key themes are project planning, working roles in the project, task allocation, scheduling, resourcing and project performance.

FHA0001640 Basics of Food Chain Anticipating, 3 cr

The student is able to:

Opintojakson keskeisenä tavoitteena on keskittyä ruokaketjun ennakkoinnin menetelmiin ja keskeisiin teorioihin. Opintojakson aikana perehdytään alan keskeisiin trendeihin.

FLM0001358 Environmental Project, 10 cr

FHA0001359 Structures in low-rise dwelling, 3 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia

FHA0001360 Basics of CAD, 3 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia

FHA0001362 Building Services and Energy Efficiency in Houses, 2 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia

FHA0001363 Statics, 2 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia

FHA0001364 Basics in Building Physics, 2 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia

FHA0001660 Concrete structures in low-rise dwelling, 3 cr

The student is able to:

Tämä teema on osa Pientalorakentaminen -moduulia (vuodesta 2015 alkaen)

FHA0001661 Schedules of House Project, 2 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia (vuodesta 2015 alkaen)

FHA0001366 Working Practices of House Project, 3 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia

FHA0001367 Cost Estimating of House Project, 2 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia

FHA0001368 Site Surveying, 3 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia

FHA0001369 Trigonometry, vector, Plane and Space Geometry, 3 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia

FHA0001662 Basics of Municipal Engineering, 2 cr

The student is able to:

Tämä teema on osa Rakennustuotannon perusteet -moduulia

FLM0001389 Co-designing, better urban living and wellbeing, 5 cr

The student is able to:

Knowledge ©- use professional concepts consistently and to be capable to discuss and communicate professional issues in interdisciplinary and international group ©- take account the nature and urban environment as a resource of health and wellbeing © ©Skills ©- analyze the initial situation and the needs of a client or a business partner ©- present alternative solutions and adapt the professional skills to the service design of the work life partner ©- choose suitable methods and explain the reasons for these solutions ©- Present the results in a written article by collaborating with international student team © ©Team work ©- act with situational awareness ©- plan and arrange the activities with the ethical principles of one's own professional field ©- organize interdisciplinary and international team work according to team's professional goals © ©Suitable for Bachelor and Master degree students interested in working in international and multidisciplinary teams, which co-design in urban living and wellbeing settings.

FLM0001390 AutoCad 2D Design, 3 cr

FLM0001395 Hazardous Materials, 5 cr

The student is able to:

Learning objectives ©The student ©- knows the classification of hazardous materials ©- knows the typical effects and reactions of hazardous materials ©- knows how to choose proper protective clothing to different kinds of chemicals ©- understand the meaning and principles of measuring gases ©- knows the most typical first aid measures in chemical accidents

FLM0001396 Climate Change and Air Pollution, 5 cr

The student is able to:

Learn to know principles of the following items: ©1. Climate change ©2. Carbon capture and storage (CCS) ©3. Mitigation of global warming ©4. EU Strategies and targets ©5. Air pollution ©6. Ozone

FLM0001415 Algebra, Geometry and Trigonometry, 5 cr

FLM0001416 Connecting Networks, 5 cr

FLM0001417 Professional English, 3 cr

FLM0001418 Professional English, 3 cr

FLM0001421 Physics Basics, 4 cr

FLM0001422 Management and Quality, 3 cr

FLM0001423 English Language and Communication, 3 cr

FLM0001424 English Supplementary Studies, 3 cr

FLM0001426 Marketing, 3 cr

FLM0001427 English for Mechatronics, 3 cr

FLM0001428 Scaling Networks, 5 cr

FLM0001429 Security and Network Management, 5 cr

FLM0001430 Wood-Based Panels Technology, 3 cr

FLM0001433 Moulds and Tools, 3 cr

FLM0001434 Swedish Supplementary Studies, 3 cr

FLM0001435 Land and Water Ecosystems, 3 cr

FLM0001436 Applied electronics, 5 cr

FLM0001437 Mathematical Statistics, 3 cr

FLM0001438 Mathematical Statistics 1, 3 cr

FLM0001439 Products for Demanding Conditions, 3 cr

FLM0001440 Usability Engineering, 3 cr

FLM0001432 Recycling and Recycled Products, 3 cr

FHA0001245 Safety in Learning Environment, 3 cr

The student is able to:

Tämä moduuli on osa Bio- elintarviketekniikka tutuksi -moduulia.

FHA0000001 The History, Culture and Concepts of Sexuality, 3 cr

The student is able to:

Tavoite: Opiskelija ymmärtää seksuaalisuuden kulttuurisidonnaisuuden.

Esitiedot:

Yhteydet muihin opintojaksoihin:

Asiasanat: sosiaali-, terveys- ja liikunta-ala, terveydenhoitotyö, sivuaineopinnot

FHA0000814 Remediation of Environment, 3 cr

The student is able to:

Tavoite: Opintojaksolla perehdytään kunnostuskäytäntöihin ja -tekniikoihin, joita sovelletaan erilaisissa kohteissa pilaantumisen, maisemallisten tai muiden syiden takia. Kohteita ovat esimerkiksi kunnostusta vaativat vesistöt (järvet, virtavesistöt) ja maa-ainesten ottoalueet. Lisäksi käsitellään rakennetun ympäristön tilaa ja siihen liittyviä kunnostustarpeita valtakunnallisten selvitysten pohjalta.

Esitiedot: 17022301 Yhdyskuntatekniikan perusteet, 17022400 Ympäristötekniikan perusteet, 17022500 Geologia, maaperäoppi, 17052700 Ympäristögeologia

Yhteydet muihin opintojaksoihin: maaperää, jätehuoltoa ja vesihuolto käsittelevät opintojaksot

FHA0000555 SAP ERP 6.0 Basics, 3 cr

The student is able to:

Opintojakson tavoitteet: Opintojakson suoritettuaan opiskelijalla on perustiedot modernien toiminnanohjausjärjestelmien (ERP) toimintaperiaatteesta ja käyttötarkoituksesta. Hän ymmärtää modernien ERP-järjestelmien roolin ja tehokkaan tiedonhallinnan tärkeyden menestyvässä liiketoiminnassa. Kurssin käytännön harjoitusten kautta opiskelija hahmottaa SAP ERP (6.0) -järjestelmän perusrakenteen ja moduulien välisen integraation konseptuaalisella tasolla. Opiskelija omaksuu ERP-järjestelmien käytännön toiminnan havainnollistavien prosessikuvausten sekä loppukäyttäjän roolissa SAP ERP 6.0 järjestelmässä tehtävien harjoitusten kautta. Osaamistavoitteet: Opiskelija ymmärtää organisaation sisäisen tehokkaan ja järjestelmäperusteisen tiedonhallinnan perusteet.

FHA0000408 Maintenance, 4 cr

FHA0001664 Urban and regional planning, 5 cr

The student is able to:

Tämä teema on osa Liikerakentaminen-moduulia

FHA0001665 Traffic safety and psychology, 5 cr

The student is able to:

Tämä teema on osa Liikenne ja maankäyttö-moduulia

FHA0001343 Basics of Environmental Engineering, 3 cr

The student is able to:

Tämä teema on osa Infrarakentamisen perusteet -moduulia

FHA0001379 CAD and BIM, 6 cr

The student is able to:

This is part of module Basis of Construction

FHA0001389 English for Engineers, 2 cr

The student is able to:

This is part of module House Building

FHA0001390 Finnish, 1 cr

The student is able to:

This is part of module House Building

FHA0001397 English for Engineers, 1 cr

The student is able to:

This is part of module Basics of Civil Engineering

FHA0001398 Finnish, 2 cr

The student is able to:

This is part of module Basics of Civil Engineering

FHA0001666 Street and road planning, 5 cr

The student is able to:

Tämä teema on osa Liikenne ja maankäyttö-moduulia

FHA0001667 Process Management, 5 cr

FHA0001668 Quality Management, 5 cr

FHA0001669 Production planning, 5 cr

FHA0001670 Purchasing, 5 cr

FHA0001671 B2B -marketing and sales, 5 cr

FHA0001672 Supply Chain Management, 5 cr

FHA0001673 Inventory Management, 5 cr

FHA0001674 Transportation, 5 cr

FHA0001675 Service Business B2B, 5 cr

FHA0001676 Organizing Service Business, 5 cr

FHA0001677 Marketing and Selling Service Products, 5 cr

FHA0001678 Process Management, 5 cr

FHA0001679 Quality Management, 5 cr

FHA0001680 Production planning, 5 cr

FHA0001681 Purchasing, 5 cr

FHA0001682 B2B –marketing and sales, 5 cr

FHA0001683 Supply chain management, 5 cr

FHA0001684 Inventory management, 5 cr

FHA0001685 Transportation, 5 cr

FHA0001686 Service Business B2B, 5 cr

FHA0001687 Organizing Service Business, 5 cr

FHA0001688 Marketing and selling Service products, 5 cr

FHA0001689 Entrepreneurship - attitude and action, 3 cr

FHA0001690 Basics of business operations, 3 cr

FHA0001691 Entrepreneurship - attitude and action, 3 cr

FHA0001692 Basics of business operations, 3 cr

FHA0001696 Smart Building Control, 5 cr

The student is able to:

To design and implement measuring and control of smart house with different automation control systems. To understand the influence of automation to energy efficiency in buildings.

FHA0001697 Leadership, 3 cr

The student is able to:

Tavoitteet: Opiskelija tuntee työ- ja organisaatiokäyttäytymisen perusteet sekä johtamisen sisällön ja keinot. Opiskelija ymmärtää ihmisjohtamisen merkityksen yrityksen menestystekijänä. Opintojaksolla tarkastellaan johtamista erilaisten "ismien" näkökulmasta.

Asiasanat: tekniikka, konetekniikka, tuotantotalous, johtaminen, organisaatio, henkilöstö

FHA0001698 Sales and Marketing, 3 cr**The student is able to:**

The student is introduced to the behaviour and segmentation of as well as the competition in the market in their own particular field. He/she is introduced to means by which companies compete, and he/she learns to evaluate marketing solutions for companies in his/her own field. From a sales and marketing point of view, the student can acquire appropriate basic knowledge, understand the significance of communication in sales and marketing, and can cope with normal sales and marketing situations in his/her own field.

FHA0001700 House Building, 15 cr**FHA0001701 Basics of Civil Engineering, 15 cr****FHA0003235 Software Development Project - Information Technology (FUAS Innovation School), 3 cr****FHA0003270 Software Development Project - Information Technology (FUAS Innovation School), 2 cr****FHA0003301 Development Project - Mechanical Engineering (FUAS Innovation School), 1 cr****FHA0003433 Development Project - Mechanical Engineering (FUAS Innovation School), 3 cr****FHA0004446 House Building, 15 cr****FHA0004447 Basics of Civil Engineering, 15 cr****FHA0004448 House Building, 15 cr****FHA0004449 Basics of Building Production, 15 cr****FHA0004453 Software Development Project - Information Technology (FUAS Innovation School), 2 cr****FHA0004454 Management and finance, 5 cr****FHA0004455 Management and finance, 5 cr****FHA0004457 Software Development Project - Information Technology (FUAS Innovation School), 3 cr**

FHA0004459 Development Project - Construction Engineering (FUAS Innovation School), 12 cr

FHA0004467 Finnish Nutrition, 5 cr

FHA0004470 Development Project - Mechanical Engineering (FUAS Innovation School), 12 cr

FHA0004471 Traffic Planning Project - Traffic (FUAS Innovation School), 12 cr

FHA0004472 Software Development Project - Information Technology (FUAS Innovation School), 12 cr

FHA0004485 Basics of Nutrition, 5 cr

FHA0004486 Food Security and Food Safety, 5 cr

FHA0004491 Project Management, 3 cr

FHA0004492 Project Management, 3 cr

FLM0001420 Energy Efficiency, 3 cr

FLM0001425 Chemistry, 3 cr

FLM0001431 Nonwoven Fabrics and Technical Textiles, 3 cr

FLM0001441 Finnish supplementary studies, 3 cr

FLM0001445 Remediation of polluted soils, 5 cr

FLM0001446 Hazardous Materials, 5 cr

FLM0001463 Water and Waste Water Treatment and Utilization, 5 cr

FLM0001464 Environmental Chemistry, 3 cr

FLM0001467 Academic Writing, 3 cr

FLM0001468 Digitalisation of the Future, 3 cr

FLM0001469 Networks, Data Security and Cloud Services, 3 cr

FLM0001470 Digital Tools, 4 cr

FLM0001484 Swedish Language Written SkillsSwedish Language Written Skills, 1.5 cr

FLM0001485 Swedish Language Oral SkillsSwedish Language Oral Skills, 1.5 cr

FLM0001486 Professional Communication (Finnish)Professional Communication (Finnish), 3 cr

FLM0001492 Processing and Productizing of Wood, Lahti UAS, 5 cr