



Aalto University
School of Science

Systems Analysis laboratory

Bachelors and Masters programs

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Systems Analysis Laboratory

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Master's Degree Programmes in Science and Technology

Master's
Programme in
Engineering
Physics

* Master's
Programme in
Mathematics
and Operations
Research

Master's
Programme in
Life Science
Informatics and
Engineering

* Master's
Programme in
Computer
Science and
Engineering

Master's
Programme
in Information
Networks

Master's
Programme in
Industrial
Engineering
and
Management



Teknistieteellinen kandidaattiohjelma Bachelor's Degree Programme in Science and Technology

TFM

TIK

INF

TUO

* Lisäksi hakukohteina ovat kansainväliset kaksoistutkinto-ohjelmat

Bachelor's program in Mathematics and Systems Science

<https://into.aalto.fi/display/fimastersci/Tutkinonuudistus>

Matematiikan ja systeemitieteiden kandi pääaine

Systemianalyysin kursseja systeemitieteisiin suuntautuville opiskelijoille

SCI-C0200 Fysiikan ja matematiikan menetelmien studio

MS-C2105 Introduction to optimization

MS-C2111 Stochastic processes

SCI-3029.kand Kandidaatintyö ja seminaari

Nämä otettava valinnaisesti:

MS-C2128 Forecasting and time series analysis

MS-C2132 Systems analysis laboratory I

Master's Programme in Mathematics and Operations Research, starting 2015

- Major
 - Applied Mathematics
 - Mathematics
 - Systems and Operations Research



Systems and operations research

Engineering / science based program with an understanding of human behavior and economics

- Dynamic modelling of phenomena
- Decision under uncertainty, risk, reasoning with data, stochastics
- Optimization
- Decision making, economics
- Computation; real life problem solving; computer support
- Communication for real life problem solving

Mathematical methods and computer skills as tools to improve understanding and problem solving

Related university programs

Stanfords – Engineering
Management Science & Engineering

<http://www.stanford.edu/dept/MSandE/cgi-bin/index.php>



MIT - Massachusetts Institute of Technology
Operations Research Center

<http://web.mit.edu/orc/www/index.html>

RELATED PROGRAMS IN AALTO

- **ELEC – Control, Robotics and Autonomous Systems;**
Automation department does not exist anymore

http://www.aalto.fi/studies/education/programme/automation_electrical_master/

- **SCI - Complex systems – Life Tech program;**
Old BECS does not exist anymore
Dept. of Neuroscience and Biomedical Engineering

<http://nbe.aalto.fi/>

<https://into.aalto.fi/download/attachments/18387816/Lifetech-CS.pdf?version=1&modificationDate=1422258678132&api=v2>

<https://into.aalto.fi/download/attachments/18387816/LST%20presentation%20short%20January%202015.pdf?version=1&modificationDate=1422267069547&api=v2>

- **BIZZ - Information and Service Management;**

Quantitative Methods & Management Science – does not exist anymore

<https://into.aalto.fi/display/en/information/MSc+Programme+in+Information+and+Service+Management>

<https://into.aalto.fi/pages/viewpage.action?pageId=12848055>

Professional Societies

- The Finnish Operations Research Society
<http://www.operaatiotutkimus.fi/english.html>
- Finnish Statistical Society <http://www.tilastoseura.fi/in-english/>
- EURO <http://www.euro-online.org/web/pages/1/home>
- INFORMS <https://www.informs.org/>
- International Society for Dynamic Games <http://www.isdg-site.org/>
- Society of risk analysis <http://www.sra.org/>
- International Society for Systems Science <http://isss.org/world/index.php>
- Int. Society for Bayesian Analysis <http://bayesian.org/>
- System Dynamics Society <http://www.systemdynamics.org/>

Doctoral Education Network in Systems Analysis, Decision Making and Risk Management

http://salserver.org.aalto.fi/vanhat_sivut/tutkijakoulu/ViennaFiles/HamalainenIIASA.pdf

Co-coordinator Tuomas Lahtinen

Systems and Operations Research Major

Mandatory Courses 30cr

MS-E2134 Decision making and problem solving

MS-E2140 Linear programming or MS-E2139 Nonlinear programming

MS-E2148 Dynamic optimization

MS-E2133 Systems analysis laboratory II

MS-E2112 Multivariate statistical analysis

TU-91.1001 Kansantaloustieteen perusteet or TU-91.2010 Managerial economics

Systems and Operations Research Major

One mandatory seminar 5 cr

MS-E2142 Seminar on optimization

MS-E2177 Seminar on case studies in operations research

MS-E2191 Graduate seminar on operations research

MS-E2198 Seminar of creative problem solving

Systems and Operations Research Major

Select 5 cr - recommended

MS-E2114 Investment science

MS-E2117 Risk analysis

MS-E2129 Systems identification

MS-E2130 Mathematical modelling

MS-E2136 Special topics in decision making (e.g. Systems Thinking)

MS-E2139 Nonlinear programming

MS-E2140 Linear programming

MS-E2146 Integer programming

MS-E2152 Game theory

MS-E2170 Simulation

SAL courses

Modelling and systems thinking

MS-C2197 Philosophy and Systems Thinking

MS-E2170 Simulation

MS-C2107 Computational Assignments in Applied Mathematics

MS-C2132 Systems Analysis Laboratory I

MS-E2130 Mathematical Modelling

MS-E2108 Independent Research Projects in Systems Analysis

MS-E2129 System Identification

MS-E2133 Systems Analysis Laboratory II

Optimization

MS-C2105 Introduction to Optimization

MS-E2139 Nonlinear Programming

MS-E2140 Linear Programming

MS-E2143 Network Optimization

MS-E2144 Optimization Theory

MS-E2146 Integer Programming

MS-E2148 Dynamic Optimization

MS-E2153 Multiple Criteria Optimization

MS-E2174 Computational Methods in Operations Research



Decision making

MS-E2134 Decision Making and Problem Solving (e.g. Systems Thinking)

MS-E2136 Special Topics in Decision Making

MS-E2152 Game Theory

Risk and economics

MS-E2114 Investment Science

MS-E2117 Risk Analysis

Statistical modelling (old courses)

MS-C2103 Design of Experiments and Statistical Models

MS-C2104 Introduction to Statistical Inference

MS-E2111 Stochastic Processes

MS-E2112 Multivariate Statistical Analysis

MS-E2118 Reliability Engineering (discontinued)

MS-E2113 Queuing Theory

MS-C2128 Forecasting and Time Series Analysis

Seminars

MS-E2115 Seminar on Stochastic Methods (discontinued)

MS-E2142 Seminar on Optimization

MS-E2177 Seminar on Case Studies in Operation Research

MS-E2191 Graduate Seminar on Operations Research

MS-E2192 Systems Research Seminar

MS-E2198 Seminar on Creative Problem Solving

General

MS-E2193 Independent Studies in Systems Analysis

MS-E2194 Research Course in Systems Science

MS-E2195 Web-based Courses in Systems Analysis

MS-C2.kandi **Systemitieteiden kandidaattiseminaari**