

Aalto University School of Science
Courses offered in English 2017-2018

Autumn term 2017

Period I 11 September - 27 October

Period II 30 October - 22 December

Spring term 2018

Period III 2 January - 16 February

Period IV 19 February - 6 April

Period V 9 April - 25 May

The link on the course code leads to the course overview and registration page in WebOodi (oodi.aalto.fi).

The extent of the courses is given in ECTS (European Credit Transfer System) credits. One credit corresponds to a workload of 27 hours.

Full-time studies correspond to 60 ECTS credits per academic year (30 credits per one term).

Most of the courses offered in English are on Master's level. In general, students at the final stages of their Bachelor studies can choose Master level courses as long as the course specific prerequisites are met (see each course separately).

Department of Computer Science

Course code	Course name	Course level	ECTS	Term	Period
CS-C3130	Information Security	Bachelor/Master	5	Autumn	I
CS-C3140	Operating Systems	Bachelor	5	Autumn	I
CS-E4005	Methods and Tools for Network Systems	Master	5	Autumn	I
CS-E4400	Design of WWW Services	Master	5	Autumn	I
CS-E4450	Explorative Information Visualization	Master	5	Autumn	I
CS-E4620	Introduction to Analytics and Data Science	Master	2	Autumn	I
CS-E4900	User-Centered Methods for Product and Service Design	Master	5	Autumn	I
CS-E5300	Enterprise Systems Architecture	Master	5	Autumn	I
CS-E5500	Acoustical Measurements	Master	5	Autumn	I
CS-E5610	Social Media	Master	4	Autumn	I
CS-E5860	Computational Genomics	Master	4-7	Autumn	I
CS-C3160	Data Science	Bachelor	5	Autumn	II
CS-E4300	Network Security	Master	5	Autumn	II
CS-E4890	Deep Learning	Master	5	Autumn	II
CS-E5220	User Interface Construction	Master	5	Autumn	II
CS-E5330	IT Governance	Master	5	Autumn	II
CS-E5870	High-Throughput Bioinformatics	Master	5-7	Autumn	II
CS-C3100	Computer Graphics	Bachelor	5	Autumn	I-II
CS-C3120	Human-Computer Interaction	Bachelor	5	Autumn	I-II
CS-C3180	Software Design and Modelling	Master	5	Autumn	I-II
CS-E3190	Principles of Algorithmic Techniques	Master	5	Autumn	I-II
CS-E3210	Machine Learning: Basic Principles	Master	5	Autumn	I-II
CS-E4100	Mobile Cloud Computing	Master	5	Autumn	I-II
CS-E4110	Concurrent Programming	Master	5	Autumn	I-II
CS-E4120	Scalable Cloud Computing	Master	5	Autumn	I-II
CS-E4140	Applications and Services in Internet	Master	5	Autumn	I-II
CS-E4210	Learning Technologies	Master	5	Autumn	I-II
CS-E4320	Cryptography and Data Security	Master	5	Autumn	I-II
CS-E4430	Web Services	Master	4	Autumn	I-II
CS-E4460	WWW Applications	Master/Doctoral	5	Autumn	I-II
CS-E4510	Distributed Algorithms	Master	5	Autumn	I-II
CS-E4590	Competitive Programming	Bachelor/Master	2-5	Autumn	I-II
CS-E4600	Algorithmic Methods of Data Mining	Master	5	Autumn	I-II
CS-E4830	Kernel Methods in Machine Learning	Master/Doctoral	5	Autumn	I-II
CS-E4850	Computer Vision	Master/Doctoral	5	Autumn	I-II
CS-E4880	Machine Learning in Bioinformatics	Master	5	Autumn	I-II
CS-E4960	Software Testing and Quality Assurance	Master	5	Autumn	I-II
CS-E5005	Research Methods in Software and Service Engineering	Master	5	Autumn	I-II
CS-E5100	Introduction to IT Business and Venturing	Master	2	Autumn	I-II
CS-E5110	Management of a Technology Venture	Master	5	Autumn	I-II
CS-E5310	ICT Enabled Service Business and Innovation	Master	5	Autumn	I-II
CS-E5710	Bayesian Data Analysis	Master	5	Autumn	I-II
CS-E5740	Complex Networks	Master	5	Autumn	I-II
CS-E5790	Computational Science	Master	5	Autumn	I-II
CS-C3170	Web Software Development	Bachelor	5	Autumn to Spring	II-III
CS-C3150	Software Engineering	Bachelor	5	Autumn, Spring	I-II,III-IV
CS-E4000	Seminar in Computer Science	Master	5	Autumn, Spring	I-II,III-V
CS-E5460	Project in Embedded Systems	Master	5-10	Autumn, Spring	I-II,III-V

CS-E4410	Semantic Web	Master	5	Spring	III
CS-E4420	Information Retrieval	Master	5	Spring	III
CS-E4940	Requirements Engineering	Master	5	Spring	III
CS-E5530	Virtual Acoustics	Master/Doctoral	5	Spring	III
CS-E5600	Aesthetics	Master	3	Spring	III
CS-E5745	Mathematical Methods for Network Science	Master	5	Spring	III
CS-E5755	Nonlinear Dynamics and Chaos	Master/Doctoral	5	Spring	III
CS-E5880	Modeling Biological Networks	Master	5–7	Spring	III
CS-C2150	Theoretical Computer Science	Bachelor	5	Spring	III-IV
CS-E4160	Laboratory Works in Networking and Security	Master	5–10	Spring	III-IV
CS-E4170	Mobile Systems Programming	Master	5	Spring	III-IV
CS-E4200	Emergent User interfaces	Master	5	Spring	III-IV
CS-E4310	Mobile Systems Security	Master	5	Spring	III-IV
CS-E4500	Advanced Course in Algorithms	Master	5	Spring	III-IV
CS-E4520	Computer-Aided Verification and Synthesis	Master	5	Spring	III-IV
CS-E4530	Computational Complexity Theory	Master	5	Spring	III-IV
CS-E4610	Modern Database Systems	Master	5	Spring	III-IV
CS-E4800	Artificial Intelligence	Bachelor/Master	5	Spring	III-IV
CS-E4820	Machine Learning: Advanced Probabilistic Methods	Master	5	Spring	III-IV
CS-E5800	Seminar on Computational Engineering	Master	3	Spring	III-IV
CS-E4950	Software Architectures	Master	5	Spring	III-V
CS-E5200	Design Project	Master	10	Spring	III-V
CS-E5520	Advanced Computer Graphics	Master	5	Spring	III-V
CS-E4840	Information Visualization	Master	5	Spring	IV
CS-E5210	Usability evaluation	Master	5	Spring	IV
CS-E5340	Introduction to Industrial Internet	Master	5	Spring	IV
CS-E5370	Law in Digital Society	Master	5–6	Spring	IV
CS-E5720	Work Course on Bayesian Analysis	Master	2	Spring	IV,V
CS-E4930	Software Processes and Projects	Master	5	Spring	IV-V
CS-E5390	Seminar on Law and Technology	Master	3–6	Spring	IV-V
CS-E5700	Hands-on Network Analysis	Master	5	Spring	IV-V
CS-E5890	Statistical Genetics and Personalised Medicine	Master/Doctoral	5	Spring	IV-V
CS-E3220	Declarative Programming	Master	5	Spring	V
CS-E4550	Advanced Combinatorics in Computer Science	Master	5	Spring	V
CS-E4580	Programming Parallel Computers	Master	5	Spring	V
CS-E5360	Systems of Systems	Master	5	Spring	V
CS-E5440	Growth and Internationalization of Technology SMEs	Master	4	Spring	V

Department of Mathematics and Systems Analysis

Course code	Course name	Course level	ECTS	Term	Period
MS-E1050	Graph theory	Master/Doctoral	5	Autumn	I
MS-E1461	Hilbert spaces	Master/Doctoral	5	Autumn	I
MS-E1651	Numerical matrix computations	Master/Doctoral	5	Autumn	I
MS-E1740	Continuum mechanics 1	Master/Doctoral	5	Autumn	I
MS-E2140	Linear programming	Master	5	Autumn	I
MS-A0211	Differential and integral calculus 2	Bachelor	5	Autumn	II
MS-E1110	Number theory	Master/Doctoral	5	Autumn	II
MS-E1280	Measure and integral	Master/Doctoral	5	Autumn	II
MS-E1652	Computational methods for differential equations	Master/Doctoral	5	Autumn	II
MS-E1741	Continuum mechanics 2	Master/Doctoral	5	Autumn	II
MS-E2139	Nonlinear programming	Master	5	Autumn	II
MS-E2114	Investment science	Master	5	Autumn	I-II
MS-E2115	Experimental and Statistical Methods in Biological Sciences	Master	5	Autumn	I-II
MS-E2133	Systems analysis laboratory II	Master	5	Autumn	I-II
MS-E2195	Web-based courses in systems analysis (V)	Master	1–6	Autumn, Spring	I-II,III-V
MS-E1289	Seminar on analysis and geometry (V)	Master/Doctoral	1–5	Full year	I-V
MS-E1659	Seminar on applied mathematics (V)	Master/Doctoral	1–5	Full year	I-V
MS-A0311	Differential and integral calculus 3	Bachelor	5	Spring	III
MS-C1080	Introduction to abstract algebra	Bachelor	5	Spring	III
MS-E1531	Differential geometry	Master/Doctoral	5	Spring	III
MS-E1600	Probability theory	Master/Doctoral	5	Spring	III
MS-E2148	Dynamic optimization	Master	5	Spring	III
MS-C2104	Introduction to Statistical Inference	Bachelor	5	Spring	III-IV
MS-E1653	Finite element method	Master/Doctoral	5	Spring	III-IV

MS-E2112	Multivariate statistical analysis	Master/Doctoral	5	Spring	III-IV
MS-A0504	First course in probability and statistics	Bachelor	5	Spring	IV
MS-E1111	Galois theory	Master/Doctoral	5	Spring	IV
MS-E1140	Algebraic geometry 1	Master/Doctoral	5	Spring	IV
MS-E1281	Real analysis	Master/Doctoral	5	Spring	IV
MS-E1601	Brownian motion and stochastic analysis	Master/Doctoral	5	Spring	IV
MS-E1654	Computational inverse problems	Master/Doctoral	5	Spring	IV
MS-E1742	Computational mechanics 1	Master/Doctoral	5	Spring	IV
MS-E2134	Decision making and problem solving	Master	5	Spring	IV
MS-E2146	Integer programming	Master	5	Spring	IV
MS-E2170	Simulation (V)	Master	5	Spring	IV
MS-E1141	Algebraic geometry 2	Master/Doctoral	5	Spring	V
MS-E1743	Computational mechanics 2	Master/Doctoral	5	Spring	V

Department of Neuroscience and Biomedical Engineering

Course code	Course name	Course level	ECTS	Term	Period
NBE-E4000	Principles of Biomedical Imaging	Master	5	Autumn	I-II
NBE-E4010	Medical Image Analysis	Master	5	Autumn	I-II
NBE-E4045	Functional Brain Imaging	Master	5	Autumn	I-II
NBE-E4050	Signal Processing in Biomedical Engineering	Master	5	Autumn	I-II
NBE-E4210	Structure and operation of the human brain	Master	5	Autumn	I-II
NBE-E4225	Cognitive Neuroscience	Master	5	Spring	III
NBE-E4020	Medical Imaging	Master	5	Spring	III-IV
NBE-E4100	Molecular Biophysics	Master	5	Spring	III-V
NBE-E4300	Medical Device Innovation	Master	5	Spring	III-V
NBE-E4140	Neurophysics	Master	5	Spring	IV-V
NBE-E4240	Advanced Course on Human Neuroscience	Master	5	Spring	IV-V

Department of Applied Physics

Course code	Course name	Course level	ECTS	Term	Period
PHYS-C6370	Fundamentals of New Energy Sources	Bachelor/Master	5	Autumn	I-II
PHYS-E0413	Theoretical Mechanics	Master	5	Autumn	I-II
PHYS-E0414	Advanced Quantum Mechanics	Master	5	Autumn	I-II
PHYS-E0415	Statistical Mechanics	Master	5	Autumn	I-II
PHYS-E0417	Experimental Methods in Physics	Master	5	Autumn	I-II
PHYS-E0424	Nanophysics	Master	5	Autumn	I-II
PHYS-E0425	Innovation and entrepreneurial approach to materials and technology	Master	8	Autumn	I-II
PHYS-E0435	Optical Physics	Master	5	Autumn	I-II
PHYS-E0460	Introduction to Reactor Physics	Master	5	Autumn	I-II
PHYS-E0565	Programming course on Monte Carlo particle transport simulations	Master	5	Autumn	I-II
PHYS-E0551	Low Temperature Physics V	Master	5-6	Full year	I,II,III,IV,V
PHYS-E0563	Fundamentals of Plasma Physics for Space and Fusion Applications	Master	5	Spring	III
PHYS-C1380	Multi-disciplinary energy perspectives	Bachelor/Master	5	Spring	III-IV
PHYS-E0416	Quantum Physics	Master	5	Spring	III-IV
PHYS-E0422	Soft Condensed Matter Physics	Master	5	Spring	III-IV
PHYS-E0423	Surface Physics	Master	5	Spring	III-IV
PHYS-E0463	Fusion Energy Technology	Master	5	Spring	III-IV
PHYS-E0483	Advances in New Energy Technologies	Bachelor/Master	5	Spring	III-IV
PHYS-E0525	Microscopy of Nanomaterials	Master	5	Spring	III-IV
PHYS-E6570	Solar Energy Engineering	Master	5	Spring	III-IV
PHYS-E0411	Advanced Physics Laboratory	Master	5	Spring	III-V
PHYS-E0412	Computational Physics	Master	5	Spring	III-V
PHYS-A0130	Electromagnetism (TFM)	Bachelor	5	Spring	IV
PHYS-E0418	Advanced Statistical Physics	Master	5	Spring	IV-V
PHYS-E0421	Solid-State Physics	Master	5	Spring	IV-V
PHYS-E0437	Laser Physics	Master	5	Spring	IV-V
PHYS-E0526	Microscopy of Nanomaterials, laboratory course	Master	5	Spring	IV-V
PHYS-E0562	Nuclear Engineering, advanced course	Master	5	Spring	IV-V
PHYS-A0140	Structure of Matter (TFM)	Bachelor	5	Spring	V

Department of Industrial Engineering and Management

Course code	Course name	Course level	ECTS	Term	Period
TU-E1010	Advanced Strategic Management	Master	5	Autumn	I
TU-E1030	Advanced Case-seminar in Strategy	Master	5	Autumn	I

TU-E2000	Aalto Introduction to Services	Master	3–6	Autumn	I
TU-E2040	Management of External Resources	Master	3–5	Autumn	I
TU-E3020	Knowledge Management in Practice	Master	5	Autumn	I
TU-E3031	Collaboration in Teams and Networks	Master	5	Autumn	I
TU-E4040	Opportunity Prototyping	Master	3	Autumn	I
TU-E1131	Financial Modeling in Strategy and Venturing	Master	5	Autumn	II
TU-E2020	Advanced Operations Management	Master	3–5	Autumn	II
TU-E3121	People in Service Operations	Master	5	Autumn	II
TU-E4060	Design & Innovation in Context	Master	6	Autumn	II
TU-E4080	Managing Innovative Sales	Master	3	Autumn	II
TU-E4090	Managing Innovative Sales, exercises	Master	3	Autumn	II
TU-C2010	Introduction to Strategic Management	Bachelor	5	Autumn	I-II
TU-C2021	Operations Management	Bachelor	5	Autumn	I-II
TU-C9270	Introduction to Networks	Bachelor	5	Autumn	I-II
TU-E2030	Advanced Project-based Management	Master	3–5	Autumn	I-II
TU-E2210	Financial Engineering I	Master/Doctoral	3–6	Autumn	I-II
TU-E6010	Philosophy	Master	3	Autumn	I-II
TU-E6110	Management of Networked Business Processes	Master	3–5	Autumn	I-II
TU-E3090	Research Assignment in Leadership and Knowledge Management	Master	5	Autumn, Spring	I-II,III-V
TU-E6140	Business Game	Master	3	Full year	I,II,III,IV,V
TU-E6130	Facilitating Collaboration in Networks	Master	5	Full year	I-V
TU-E2220	Financial Engineering II	Master/Doctoral	3–6	Spring	III
TU-E3040	Human Potential	Master	5	Spring	III
TU-E3110	Work Design in Organizations	Master	5	Spring	III
TU-E1021	Strategies for Growth and Renewal	Master	5	Spring	III-IV
TU-E2012	Service Operations Management	Master	5	Spring	III-IV
TU-E2110	Innovation in Operations and Services	Master	3–5	Spring	III-IV
TU-E2120	Project Business	Master	3–5	Spring	III-IV
TU-E2130	Operations Management for New Ventures	Master	3–5	Spring	III-IV
TU-E4100	Startup Experience	Master/Doctoral	9	Spring	III-IV
TU-E6120	Co-development Interventions in Business Networks	Master	5	Spring	III-IV
TU-C1020	Creating Value	Bachelor	5	Spring	III-V
TU-C3030	Basics in Research and Development (R&D) Management	Bachelor	3–5	Spring	III-V
TU-E1120	Strategic Management of Technology and Innovation	Master	5	Spring	III-V
TU-E3010	Leading as practice	Master	5	Spring	III-V
TU-E1140	Contracting in Strategy and Venturing	Master	2	Spring	IV
TU-E3150	Safety Management in Complex Sociotechnical Systems	Master	5	Spring	IV
TU-E4030	Entrepreneurial Finance	Master	5	Spring	IV
TU-C3021	Managing knowledge and knowledge-intensive organizations	Bachelor	5	Spring	IV-V
TU-E4050	Entrepreneurial Leadership	Master	5	Spring	V
TU-E4070	Entrepreneurial Marketing	Master	5	Spring	V