

Studies in the programme by research fields are listed below.

Photonics

The studies in the discipline and field of research:

Course	Code	(ECTS)	2018-2019	2019-2020	2020-2021
Advanced Biomedical Optics	3313005	4	-	X	-
Optical Metrology and Fabrication	3313004	4	X	X	X
Commercializing high-tech (example photonics)	3313008	4	X	-	X
Spectral Imaging Devices	3312031	5	X	-	X
Display Technology	3312025	5	X	X	X
Joensuu Summer School on Optics	3313002	2-5	summer	summer	summer

Computer science

The studies in the discipline and field of research:

Course	Code	(ECTS)	2018-2019	2019-2020	2020-2021
Design and Analysis of Algorithms	3621511	5	X	X	X
Advanced Topics in Algorithms	3621647	3	-	X	-
Introduction to digitalization of society	3621665	5	-	X	-
Pattern Recognition	3621517	5	X	X	X
Usability Engineering	3621549	5	-	X	-
User Centered Design	3621533	5	X	-	X
Computational Intelligence II	3621553	5	-	X	-
Computational Color	3621520	5 (J)	X	-	-
Software Engineering	3621512	5	X	X	X
Research Methods in Computer Science	3621513	5	X	X	X
Parallel Computing	3621528	5	-	X	-
Clustering Methods	3621552	5	X	-	X
Color Science Laboratory	3621555	3-5 (J)	X	X	X
Deep Learning	3621xxx	5	X	X	X
Algorithmic Data Analysis	3621680	5	X	X	X
Matrix Decompositions in Data Analysis	3621681	5	X	-	-
Probabilistic inference for data science 1	3622352	5		x	x
Probabilistic inference for data science 2	3622353	5		x	x
Statistical data analysis	3622351	6		x	x
Statistical experimental design	3622233	5		x	
Analysis of grouped data	3622350	5		x	

Spatial statistics	3622349	5	x	x
Bayesian inference 1	3622347	5	x	x
Bayesian inference 2	3622348	5	x	x

Chemistry

The studies in the discipline and field of research:

Course	Code	(ECTS)	2018- 2019	2019- 2020	2020- 2021
Physical Methods in Inorganic Chemistry	3410302	4	-	x	-
Organometallic Chemistry	3410303	4	x	-	x
Theoretical Inorganic Chemistry	3410360	4	-	x	-
Theoretical Chemistry	3410305	4	x	-	x
Molecular Modelling	3410307	4	x	-	x
Surface Chemistry	3410308	4	-	x	-
Principles in Materials Science	3410310	4	-	x	-
Catalysis	3410367	4	-	x	-
Polymers and nanomaterials	3410369	4	x	-	x
Theoretical Organic Chemistry	3410314	4	x	-	x
Structures of Proteins	3410315	4	-	x	-
Basic Principles of Mass Spectrometry	3410316	4	x	-	x
Chemistry of Biofuels	3410365	4	-	x	-
Practical Molecular Modelling	3410333	3	x	-	x
NMR spectroscopy	3410334	3	x	x	x
X-Ray Diffraction	3410335	3	x	-	x
Characterization Methods for Polymers	3410336	3	-	x	-
Biological Mass Spectrometry	3410364	3	x	-	x
Postgraduate Seminar	3410411	2	x	x	x
Final examination in Chemistry	3410370	4-8	x	x	x

Mathematics

The studies in the discipline and field of research:

Those courses that are not lectured during 2018-2021, can be completed by book exam.

Course	Code	(ECTS)	2018- 2019	2019- 2020	2020- 2021
Topology	3317161	8	-	x	-

Dynamic systems	3317342	8	-	-	-
Ahlfors theory	3318217	2-10	-	-	-
Bergman spaces	3318218	2-10	-	-	-
Blaschke products	3318219	2-10	-	-	-
Partial Differential Equations	3317321	8	-	x	-
Bloch spaces and normal functions	3318220	2-10	-	-	-
Nonlinear Potential Theory	3318221	2-10	-	-	-
Functional Analysis	3318236	8	-	-	-
Introduction to Harmonic Analysis	3318237	4	-	-	-
Graduate Course in Functional Analysis	3318222	2-10	-	-	-
Hardy Spaces	3318223	2-10	-	-	-
Kernel Functions of Hilbert Spaces	3318224	2-10	-	-	-
Holomorphic curves in a projective space	3318225	2-10	-	-	-
Special Course on Complex Analysis	3318213	8	-	-	-
Complex difference equations	3318226	2-10	-	-	-
Complex difference equations	3318227	2-10	-	-	-
Entire Functions	3318214	8	-	-	-
Lacunary Series	3318228	2-10	-	-	-
Summer School in Mathematical Analysis	3318235	2-4	-	-	-
Research Seminar in Mathematics	3318412	2-8	-	x	-
Normal Families of Meromorphic functions	3318229	2-10	-	-	-
Nevanlinna Theory	3318215	8	x	-	-
Subharmonic Functions	3318230	2-10	-	-	-
PDE, Variation Methods and Sobolev Spaces	3318231	2-10	-	-	-
Operator theory in function spaces	3318232	2-10	-	-	-
p-adic Analysis	3318233	2-10	-	-	-
Rieman Mapping Theorem and the Dirichlet Problem	3318216	8	-	-	-
Introduction to Univalent Functions	3318234	2-10	-	-	-

Computational physics and inverse problems

The studies in the discipline and field of research:

Course	Code	2018- 2019	2019- 2020	2020- 2021
Research Seminar on Computational Physics	3353312	x	x	x
Numerics in Computational Physics	3352617	x		x
Osittaisdifferentiaaliyhtälöt, Partial Differential Equations	3356512	x	x	x
Elementtimenetelmät, Finite Element Methods	3352603		x	
Käänteisongelmat, Inverse Problems	3352604	x		x
Optimointi, Optimization	3352601	x		x
Tilastolliset inversio- ongelmat, Statistical Inverse Problems	3352609		x	
Data Analysis in Physics, Fysiikan data-analyysi	3351511	x	x	x
Statistical Data Analysis for Applied Physics	3352754	x		x
Time Series Analysis		x		x
Estimointiteoria, Estimation Theory	3352610		x	
Signaalianalyysi, Signal Analysis	3352542	x		x
Digitaalinen kuvankäsittely, Digital Image Processing	3352541		x	
Kuva-analyysi, Image Analysis	3352612		x	
Fysikaalinen akustiikka, Physical Acoustics	3352615		x	

Siirtoilmiöt, Transport Phenomena	3351555		x		x
Technical Programming	3352618				
Probability Theory, Todennäköisyyslaskenta	3356523		x	x	x

Medical physics and technology

The studies in the discipline and field of research:

Course	Code	(ECTS)	2018-2019	2019-2020	2020-2021
Biomaterials	3352571	5	x		x
Biomechanics	3352575	5	x		x
Characterization of Materials	3352573	5		x	
Data Analysis in Physics	3351511	5	x	x	x
Digital Image Processing	3352541	5		x	
Estimation Theory	3352610	5		x	
Finite Element Methods	3352603	5		x	
Image Analysis	3352612	5		x	
Inverse Problems	3352604	5	x		x
X-ray power diffraction	3352577	5	x		x
Magnetic Resonance Imaging	3352545	5		x	
Material techniques	3352572	5	x		x
Medical Approval Process	3352576	5		x	
Physics in Clinical Physiology and Neurophysiology	3352515	5		x	
Time Series Analysis	3352611	5	x		x
Introduction to Nanotechnology	3352579	5		x	
Nuclear Medicine Physics	3352503	5		x	
Numerics in Computational Physics	3352617	5	x		x
Optimization	3352601	5	x		x
Physical Acoustics	3352615	5		x	
Physics in Clinical Radiology	3352501	5	x		x
Physics in Radiotherapy	3352502	5	x		x
Research seminars on Medical Physics and Technology	3353311	2	x	x	x
Signal Analysis	3352542	5	x		x

Statistical Inverse Problems	3352609	5		x
Ultrasound Techniques in Medicine	3352544	5	x	x