

Course code	Course name	Study credits	Study period	Language of instruction	Mode of teaching
PAP301	Seminar in Particle Physics and Astrophysical Sciences	5 cr	1.-4. period (2nd year)	English	contact teaching
Astrophysical Sciences study track					
PAP304	Plasma Physics	5 cr	1. period	English	contact teaching
PAP320	Radiative Transfer	5 cr	1. period	English, Finnish	contact teaching
PAP302	Open problems in modern astrophysics	5 cr	1.-2. period	English	contact teaching
PAP306	Advanced Course in Observational Astronomy I	5 cr	1.-2. period	English	contact teaching
PAP308	Special Course in Observational Astronomy	5 cr	1.-2. period	English	contact teaching
PAP311	Small Bodies in the Solar System	5 cr	1.-2. period	English	contact teaching
PAP312	Time Series Analysis in Astronomy	5 cr	1.-2. period	English	contact teaching
PAP305	Space Applications of Plasma Physics	5 cr	2. period	English	contact teaching
MATR323	Basics of Monte Carlo Simulations	5 cr	3. period	English	contact teaching
PAP303	Statistical Inverse Methods	5 cr	3.-4. period	English, Finnish	contact teaching
PAP323	Advanced Space Plasma Physics	10 cr	3.-4. period	English	contact teaching
PAP351	Stellar magnetic activity	5 cr	3.-4. period	English	contact teaching
PAP307	Advanced Course in Observational Astronomy II	5 cr	4. period	English	contact teaching
PAP314	Introduction to light scattering	5 cr	4. period	English, Finnish	contact teaching
PAP309	Interstellar Matter	5 cr	not offered 25-26	English	contact teaching
PAP313	Variable Stars	5 cr	not offered 25-26	English	contact teaching
PAP315	Computational light scattering	5 cr	not offered 25-26	English	contact teaching
PAP316	Astrophysical light scattering problems	5 cr	not offered 25-26	English	contact teaching
PAP317	Galactic dynamics	5 cr	not offered 25-26	English	contact teaching
PAP318	Galaxy formation and evolution	5 cr	not offered 25-26	English	contact teaching
PAP319	High Energy Astrophysics	5 cr	not offered 25-26	English	contact teaching
PAP321	Solar Physics	5 cr	not offered 25-26	English	contact teaching
PAP324	Numerical Space Physics	5 cr	not offered 25-26	English	contact teaching
PAP354	Space and Astrophysical Plasma Turbulence	5 cr	not offered 25-26	English	contact teaching
MATR322	Numerical Methods in Scientific Computing	10 cr	not offered 25-26	English	contact teaching
Particle Physics and Cosmology study track					
PAP332	Introduction to Particle Physics I	5 cr	1. period	English	contact teaching
TCM304	Mathematical Methods of Physics IIIa	5 cr	1. period	English	includes both contact and distance teaching
TCM327	Quantum Field Theory I	5 cr	1. period	English	includes both contact and distance teaching
PAP328	Laboratory course on instrumentation	5 cr	1.-2. period	English	contact teaching
PAP334	Statistical Methods	5 cr	1.-2. period	English	contact teaching
PAP338	Gaseous radiation detectors and scintillators	5 cr	1.-2. period	English	contact teaching
PAP347	Theories beyond the standard model	5 cr	1.-2. period	English	contact teaching
PAP325	Introduction to Particle Physics II	5 cr	2. period	English	contact teaching
PAP326	Cosmology II	5 cr	2. period	English	contact teaching
TCM305	Mathematical Methods of Physics IIIb	5 cr	2. period	English	includes both contact and distance teaching
TCM328	Quantum Field Theory II	5 cr	2. period	English	includes both contact and distance teaching
PAP348	General relativity I	5 cr	3. period	English	contact teaching
TCM329	Quantum Field Theory III	5 cr	3. period	English	includes both contact and distance teaching
TCM302	Quantum Mechanics IIa	5 cr	3. period	English	includes both contact and distance teaching
MATR323	Basics of Monte Carlo Simulations	5 cr	3. period	English	includes both contact and distance teaching
PAP327	Particle Physics Phenomenology	5 cr	3.-4. period	English	contact teaching
PAP331	Computing Methods in High Energy Physics	5 cr	3.-4. period	English	contact teaching
PAP339	Semiconductor radiation detectors	5 cr	3.-4. period	English	includes both contact and distance teaching
MATR386	Physics of positrons in solids and defects	5 cr	3.-4. period	English	contact teaching
PAP344	Introduction to the Physics of Neutrinos	5 cr	4. period	English	contact teaching
PAP349	General relativity II	5 cr	4. period	English	contact teaching
TCM303	Quantum Mechanics IIb	5 cr	4. period	English	includes both contact and distance teaching
TCM332	Quantum Field Theory IV	5 cr	4. period	English	includes both contact and distance teaching
PAP329	Particle Physics Experiments	5 cr	not offered 25-26	English	contact teaching
PAP340	Physics of semiconductor devices	5 cr	not offered 25-26	English	includes both contact and distance teaching
PAP346	Path Integral Quantization of Gauge Field Theories	5 cr	not offered 25-26	English	contact teaching
PAP352	Galaxy Survey Cosmology	5 cr	not offered 25-26	English	contact teaching
PAP353	Gravitational Lensing	5 cr	not offered 25-26	English	contact teaching
Data Science courses (you can select up to 15 credits and include them in your optional advanced studies)					
MAST32001	Computational statistics	5 cr	1. period	English	contact teaching
DATA11001	Introduction to Data Science	5 cr	1. period	English	contact teaching
DATA11002	Introduction to Machine Learning	5 cr	2. period	English	contact teaching
LSI35002	Bayesian Data Analysis	5 cr	2. period	English	contact teaching
DATA16001	Network Analysis	5 cr	3. period	English	includes both contact and distance teaching
DATA12001	Advanced Course in Machine Learning	5 cr	4. period	English	contact teaching

DATA20046	Neural Networks and Deep Learning	5 cr	4. period	English	contact teaching
MATR326	Tools of High Performance Computing	5 cr	4. period	English	contact teaching