Curriculum master Applied Physics for students enrolled 2022/2023

First and second year (M1 en M2)		
Course code	**Name**	**EC**
M1		
Compulsory courses (20 EC)		
202200093	Quantum Mechanics 2	5
201900080	Mathematical and Numerical Physics	5
191470241	Heat and Mass Transfer	5
201900282	Small Signals and Detection	4
201900281	Ethical and Cultural Awareness	1
Specialization courses (20 EC)		20
Elective courses physics/technical		10
Elective courses free		10/0
M2		
Internship, 193599010 / 201700185		20/30
Master's Assignment, General Aspects 201800345 / Physical Aspects 201800344		40
Total master		**120**

Chair courses Applied Physics

Organised in research clusters

Applied Nanophotonics		
General Applied Nanopotonics		
Specialisation course		
202200044	Fundamentals of Photonics	5
Biomedical Optics		
Specialisation courses		
202200295	Laser Physics and Nonlinear Optics	5
202000663	Molecular Structure and Spectroscopy (part of AT module 9)	2.5
193500000	Biomedical Optics	5
Integrated Optics		
Specialisation courses		
202200295	Laser Physics and Nonlinear Optics	5
191210880	Integrated Optics	5
202200045	Integrated Photonic Systems and Experiments	5
Light and Matter Interaction		
Specialisation courses		
202200046	Light and Matter	5
202200047	NanoPlasmonics	5
202200048	Quantum and Classical Emitters	5
Quantum Optics		
Specialisation courses		
202100083	Quantum Optics	5
191210880	Integrated Optics	5
202100078	Quantum Information	5
Recommended elective courses ANP cluster		
-	All courses from the other specialisations within the ANP cluster	
201700034	Introduction to Partial Differential Equations	5
201500405	Complex Function Theory	3
202200103	Image Processing and Computer Vision	5

Energy, Materials and Systems

Energy Materials & Systems (EMS), prof.dr.ir. H.J.M. ter Brake

Specialisation courses

193530000	Introduction to Superconductivity	5
201100214	Applications of Superconductivity	5
201100146	Cryogenic Science and Technology	5
-	Course in consultation with chair	5

*Recommended elective courses:**

193570010	Advanced Fluid Mechanics	5
193510040	Theoretical Solid State Physics	5
193550020	Surfaces and Thin Layers	5
193530040	Introduction to High Energy Physics	5
193530010	Nanophysics	5
193580020	Experimental Techniques in Physics of Fluids	5
201700026	Electrical Power Engineering and System Integration	5
201400037	Linear Solid Mechanics	5
201800131	Numerical Methods for Engineers	5
193565000	Capillarity Phenomena	5

Nano Electronic Materials

Computational Chemical Physics(CCP), prof.dr. C. Filippi

Specialisation courses

193570050	Advanced Quantum Mechanics	5
193510040	Theoretical Solid State Physics	5
202100210	Electronic Structure Theory	5
-	Course in consultation with chair	5

*Recommended elective courses:**

		5
202100223	Computational Physics	3/5
202100224	Machine Learning	4
202000694	Classical Mechanics	5
193570040	Theory of General Relativity	5
201500405	Complex Function Theory	3
202100078	Quantum Information	5
193530010	Nanophysics	5
200900066	Introduction to the Physics of Correlated Electrons	

Industrial Focus Group XUV Optics (XUV), prof.dr. M.D. Ackermann

Specialisation courses

193530010	Nanophysics	5
193550020	Surfaces and Thin Layers	5
202100209	X-rays for Science and Technology	5
1 out of 3:		
193700040	AMM-Inorganic Materials Science	5
193700010	AMM-Characterisation	5
202200044	Fundamentals of Photonics	5

*Recommended elective courses, the aforementioned 3 plus::**

		5
193510040	Theoretical Solid State Physics	5
193570050	Advanced Quantum Mechanics	5
191210730	Technology	5
201900042	Nanomaterials Research	5

Inorganic Materials Science (IMS), prof.dr.ing. A.J.H.M. Rijnders

Specialisation courses

193700010	AMM-Characterization	5
193700040	AMM-Inorganic Materials Science	5
-	Course in consultation with chair	5

1 out of 3:

193550020	Surfaces and Thin Layers	5
202200044	Fundamentals of Photonics	5
201700025	Solar Energy	5

*Recommended elective courses:**

193510040	Theoretical Solid State Physics	5
193530010	Nanophysics	5
201300139	Laser Physics	5
200900066	Introduction to the Physics of Correlated Electrons	5
193530000	Introduction to Superconductivity	5

Interfaces and Correlated Electron Systems (ICE), prof.dr.ir. J.W.M. Hilgenkamp

Specialization courses

193510040	Theoretical Solid State Physics	5
193530010	Nanophysics	5
193530000	Introduction to Superconductivity	5
-	Course in consultation with chair	5

*Recommended elective courses:**

200900066	Introduction to the Physics of Correlated Electrons	5
202100078	Quantum Information	5

Physics of Interfaces and Nanomaterials (PIN), prof.dr.ir. H.J.W. Zandvliet

Specialisation courses

193530010	Nanophysics	5
193550020	Surfaces and Thin Layers	5
201500167	Modern Topics in Condensed Matter Physics	5
-	Course in consultation with chair	5

*Recommended elective courses:**

193510040	Theoretical Solid State Physics	5
200900066	Introduction to the Physics of Correlated Electrons	5
201100254	Advanced Computer Vision and Pattern Recognition	5

Quantum Transport in Matter (QTM), prof.dr.ir. A. Brinkman

Specialisation courses

193510040	Theoretical Solid State Physics	5
193530010	Nanophysics	5
193530000	Introduction to Superconductivity	5
-	Course in consultation with chair	5

*Recommended elective courses:**

200900066	Introduction to the Physics of Correlated Electrons	5
202100078	Quantum Information	5

Physics of Fluids

Physics of Fluids (PoF), prof.dr. D. Lohse

Specialisation courses

193570010	Advanced Fluid Mechanics	5
193580020	Experimental Techniques in Physics of Fluids	5

10 EC out of:

193565000	Capillarity Phenomena (recommended)	5
193580010	Turbulence (recommended)	5
201400194	Granular Matter	5
201400195	Fluids and Elasticity	2.5
193572010	Physics of Bubbles	2.5
193542070	Medical Acoustics	5

1 out of 2 (not both, due to overlap):

201800131	Numerical Methods for Engineers	5
191154731	Computational Fluid Dynamics	5

*Recommended elective courses, all of the above plus:**

201500405	Complex Function Theory	3
191560430	Nonlinear Dynamics	5
202001413	Soft Matter Physics	5
193400121	Nano-Fluidics	5

Soft Matter

BioElectronics (BE), prof.dr. S.J.G. Lemay

Specialisation courses

202001413	Soft Matter Physics	5
202001414	Physical Biology	5
193400121	Nano-Fluidics	5
-	Course in consultation with chair	5

*Recommended elective courses:**

193565000	Capillarity Phenomena	5
201800083	Advanced Colloids and Interfaces	5
201700187	Soft and Biological Techniques**	5

Nano BioPhysics (NBP), prof.dr. M.M.A.E. Claessens

Specialisation courses

202001414	Physical Biology	5
193640020	Biophysical Techniques and Molecular Imaging	5
-	Courses in consultation with chair	10

*Recommended elective courses:**

202001413	Soft Matter Physics	5
202200048	Classical and Quantum Emitters	5
193400111	Bionanotechnology	5
201700187	Soft and Biological Techniques**	5
202200044	Fundamentals of Photonics	5
193400131	Nano-Optics	5
202200295	Laser Physics Nonlinear Optics	5
202200045	Integrated Photonic Systems and Experiments	5
193700010	AMM-Characterization	5

Physics of Complex Fluids (PCF), prof.dr. F.G. Mugele

Specialisation courses		
193565000	Capillarity Phenomena	5
193400121	Nano-Fluidics	5
202001413	Soft Matter Physics	5
-	Course in consultation with chair	5
Recommended elective courses:*		
201800083	Advanced Colloids and Interfaces	5
201700187	Soft and Biological Techniques**	5
193570010	Advanced Fluid Mechanics	5
201400195	Fluids and Elasticity	2.5
193730060	Polymer Physics	5

* For every chair, a specific Capita Selecta course (CS) is available, for activities done in the chair not belonging to regular courses. The content, form and size are in agreement with the chair. There is a Grade form CS courses AP to register course code, name, EC, subject, material used, assessment and a title.
** Soft and Biological Techniques requires previous knowledge, depending on your specific background. In addition, there is a maximum number of students that can participate. Please contact Michel Duits.