DRAFT!! Master's curriculum Applied Physic 2026-2027

For students enrolled in academic year 2026-2027

First year (M1)				
Course code	**Name**	**Examiner**	**Planning**	**EC**
Compulsory courses				**20**
202200093	Quantum Mechanics 2	Klärs, J.	Q1/1A	5,0
201900080	Mathematical and Numerical Physics	Stevens, R.J.A.M.	Q2/1B	5,0
191470241	Heat and Mass Transfer	Maass, C.C.	Q3/2A	5,0
201900282	Small Signals and Detection	Marpaung, D.A.I.	Q4/2B	4,0
201900281	Ethical and Cultural Awareness	Offerhaus, H.L.	Q4/2B	1,0
Electives				**10/20**
	Electives physics/technical			10,0
	Free electives master's level[1]			0/10
Specialisation courses. (*See page 2 onwards.*)				**20**

Second year (M2)				
Course code	**Name**	**Coordination**	**Planning**	**EC**
Internship *(1 of 2)* [1]				**20/30**
193599010	Internship AP	Internship office S&T	Year	20,0
201700185	Internship AP	Internship office S&T	Year	30,0
Master's Assignement		Coordination		**40**
201800344	Master's Assignment: Physics Aspects	M-AP programme	Year	20,0
201800345	Master's Assignment: General Aspects	M-AP programme	Year	20,0
			Total master	**120**

[1] *The student may choose to do a 30 EC instead of a 20 EC internship. In that case, the 10 EC of free electives are forfeited*

Capita Selecta (CS) course

A Capita Selecta course offers students the opportunity to explore a fundamental or current topic in physics in case the subjects are not covered by a regular course at the same level. The emphasis is on theoretical depth; the application of physics or engineering skills is not part of the course. The content, learning objectives, and assessment are developed in consultation with a research group chair and/or chair of the master's assignment committee and submitted to the programme director for review and approval.

To formalise this process, the designated form must be used: Grade Form Capita Selecta AP.

The Capita Selecta course can be used as course in the physics/technical electives part of the study programme.

Applied Physics research specialisations

Photonics

AQO (Pinkse), BMPI (Steenbergen) IOS (Garçia Blanco) NLNP (Marpaung)

Course code	Name	Examiner	Planning	EC
Mandatory Photonics				
202200044	Fundamentals of Photonics	Saive, R.	Q1/1A	5,0
Tracks Applied NanoPhotonics				
Biomedical Optics				
202200295	Laser Physics and Nonlinear Optics	Slot, van der P.J.M.	Q2/1B	5,0
193500000	Biomedical Optics	Vellekoop, I.M.	Q4/2B	5,0
Integrated Optics				
202200295	Laser Physics and Nonlinear Optics	Slot, van der P.J.M.	Q2/1B	5,0
191210880	Integrated Optics	Garcia Blanco, S.M.	Q3/2A	5,0
202200045	Integrated Photonic Systems and Experiments	Marpaung, D.A.I.	Q3/2A	5,0
Light and Matter Interaction				
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4/2B	5,0
202200047	NanoPlasmonics	lin, Q.	Q4/2B	5,0
Quantum Optics				
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0
202100083	Quantum Optics	Pinkse, P.W.H.	Q2/1B	5,0
191210880	Integrated Optics	Garcia Blanco, S.M.	Q3/2A	5,0
Recommended electives Applied NanoPhotonics				
-	All courses from the other specialisations within the ANP department			
202200103	Image Processing and Computer Vision	Abayazid, M	Q1/1A	5,0
202400632	Introduction to Partial Differential Equations	Pérez Arancibia, C.A.	Q3/2A	4,0
201500405	Complex Function Theory	Zwart, H.J.	Q4/2B	3,0

Materials Science

CCP (Filippi), EMS (van Oort), ICE (Hilgenkamp), IMS (Rijnders), PIN (Zandvliet), QTM (Brinkman), XUV (Ackermann),

Course code	Name	Examiner	Planning	EC
	Energy Materials & Systems (EMS)			
193530000	Introduction to Superconductivity	Dhalle, M.M.J.	Q1/1A	5,0
201100214	Applications of Superconductivity	Dhalle, M.M.J.	Q2/1B	5,0
202400605	Cooling Science and Technology	Vanapalli, S.	Q4/2B	5,0
Recommended electives EMS				
193570010	Advanced Fluid Mechanics	Huisman, S.G.	Q1/1A	5,0
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193565000	Capillarity Phenomena	Snoeijer, J.H.	Q2/1B	5,0
201700026	Electrical Power Engineering and System Integrat	Dhalle, M.M.J.	Q2/1B	5,0
193530040	Introduction to High Energy Physics	du Pree, T.	Q3/2A	5,0
193550020	Surfaces and Thin Layers	Wormeester, H.	Q3/2A	5,0
193580020	Experimental Techniques in Physics of Fluids	Marin, A.	Q3/2A	5,0
201400037	Linear Solid Mechanics	Rege, A.G.	Q3/2A	5,0
201800131	Numerical Methods for Engineers	Lammertink, R.G.H.	Q4/2B	5,0

	Computational Chemical Physics (CCP)			
193570050	Advanced Quantum Mechanics	Filippi, C.	Q2/1B	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, B.	Q4/2B	5,0
202100210	Electronic Structure Theory	Bokdam, M.	Q4/2B	5,0
Recommended electives CCP				
202000694	Classical Mechanics	Filippi, C.	Q1/1A	4,0
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
202100223	Computational Physics	Filippi, C.	Q3/2A	2,5/5,0
202100224	Machine Learning	Bokdam, M.	Q3/2A	5,0
201500405	Complex Function Theory	Weele, M. C. van der	Q4/2B	3,0

	Industrial Focus Group XUV Optics (XUV)			
193530010	Nanophysics	Zandvliet, GH.J.W.	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester, H.	Q3/2A	5,0
202300191	X-rays for Science and Technology	Beld, Van den, W.T.E.	Q4/2B	5,0
Electives 1 of 3				
193700010	Characterisation	Wenderich, K.	Q1/1A	5,0
202200044	Fundamentals of Photonics	Saive, R.	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C	Q3/2A	5,0
Recommended elective courses, the aforementioned 3 plus:				
193570050	Advanced Quantum Mechanics	Filippi, C.	Q2/1B	5,0
191210730	Fabrication of Micro- and Nanodevices	Kovalgin, A.Y.	Q2/1B	5,0
201900042	Nanomaterials Research	Beld, Van den, W.T.E.	Q4/2B	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4 2B	5,0

	Inorganic Materials Science (IMS)			
193700010	Characterisation	Wenderich, K.	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C.	Q3/2A	5,0
Electives 1 of 3				
202200044	Fundamentals of Photonics	Saive, R	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester, H.	Q3/2A	5,0
201700025	Solar Energy	Saive, R.	Q3/2A	5,0
Recommend elective courses IMS				
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle, M.M.J.	Q1/1A	5,0
202200295	Laser Physics and Nonlinear Optics	Slot, van der, P.J.M.	Q2/1B	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4 2B	5,0

	Interfaces and Correlated Electron Systems (ICE)			
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle, M.M.J.	Q1/1A	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4/2B	5,0
Recommended electives courses ICE				
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0

	Physics of Interfaces and Nanomaterials (PIN)			
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester, H.	Q3/2A	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4/2B	5,0

	Quantum Transport in Matter (QTM)			
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle, M.M.J.	Q1/1A	5,0
Recommended elective courses QTM				
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0

Fluids				
	Fluids Physics			
Course code	**Name**	**Examiner**	**Planning**	**EC**
193570010	Advanced Fluid Mechanics	Huisman, S.G.	Q1/1A	5,0
193580020	Experimental Techniques in Physics of Fluids	Marin, A.	Q3/2A	5,0
Electives 10 EC out of:				
193580010	Turbulence (recommended)	Stevens, R.J.A.M.	Q2/1B	5,0
193572010	Physics of Bubbles	Versluis, M.	Q2/1B	2,5
193565000	Capillarity Phenomena (recommended)	Snoeijer, J.H.	Q2/1B	5
201400194	Granular Matter	Meer, van der, R.M.	Q3/2A	5,0
193542070	Medical Acoustics	Lajonie, G.P.R.	Q3/2A	5,0
201800131	Numerical Methods for Engineers *	Lammertink, R.G.H.	Q4/2B	5,0
191154731	Computational Fluid Dynamics *	Weide, van der, E.T.A.	Q4/2B	5,0
	* *Due to overlap, these may not be chosen together*			
Recommended elective courses, all the aforementioned plus:				
191560430	Nonlinear Dynamics	Meijer, H.G.E.	Q1/1A	5,0
202001413	Soft Matter Physics	Vutukuri, H.R.	Q3/2A	5,0
193400121	Nano-Fluidics	Sîretanu, I.	Q3/2A	5,0
201500405	Complex Function Theory	Weel, Van der, M.C.	Q4/2B	3,0

	Physics of Complex Fluids (PCF)			
193565000	Capillarity Phenomena	Snoeijer, J.H.	Q2/1B	5,0
193400121	Nano-Fluidics	Sîretanu, I.	Q3/2A	5,0
202001413	Soft Matter Physics	Vutukuri, H.R.	Q3/2A	5,0
	- Course in consultation with Chair			
Recommended elective courses:				
201800083	Advanced Colloids and Interfaces	Wood, J.A.	Q1/1A	5,0
193570010	Advanced Fluid Mechanics	Huisman, S.G.	Q1/1A	5,0

Applied Physics focus specialisations

Quantum Electronics

Research groups: CCP (Filippi), ICE (Hilgenkamp), NE (Wiel, van der), PIN (Zandvliet), QTM (Brinkman)

Course code	Name		Planning	EC
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0
193570050	Advanced Quantum Mechanics	Filippi, C.	Q2/1B	5,0
Quantum Electronics Electives 10 EC of;				
193530010	Nanophysics	Zandvliet, H.J.W.	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle, M.M.J.	Q1/1A	5,0
193530040	Introduction to High Energy Physics [4]	du Pree, T.A.	Q3/2A	5,0
193400141	Nano-Electronics	Jong, de, M.P.	Q2/1B	5,0
202500546	Advanced Condensed Matter Physics	Bampoulis, P.	Q4/2B	5,0
202100210	Electronic Structure Theory	Bokdam, M.	Q4/2B	5,0

Quantum Optics

Research groups: AQO (Pinkse), NLNP (Marpaung), IOS (García Blanco), OS (Offerhaus), HMOE (Nijhuis)

Course code	Name		Planning	EC
202100078	Quantum Information	Pinkse, P.W.H.	Q1/1A	5,0
193570050	Advanced Quantum Mechanics	Filippi, C.	Q2/1B	5,0
Quantum Optics Electives 10 EC of;				
202200044	Fundamentals of Photonics	Saive, R.	Q1/1A	5,0
202100083	Quantum Optics	Pinkse, P.W.H.	Q2/1B	5,0
191210880	Integrated Optics	Garcia Blanco	Q3/2A	5,0

Digitizing Physics / Machine Aided Physics*

Research groups: tbd

Course code	Name		Planning	EC
Recommended electives				
202200103	Image Processing and Computer Vision	Niu, K.	Q1/1A	5,0
202100223	Computational Physics	Filippi, C.	Q3/2B	5,0
202600001	Machine Learning	Bokdam, M.	Q3/2B	5,0
202600002	Remote Control of Experiments	Verschuur, J.W.J.	Q3/2B	5,0
201800131	Numerical Methods for Engineers	Lammertink, R.G.H.	Q4/2B	5,0
201100254	Advanced Computer Vision and Pattern Recogniti	Spreeuwers, L.J.	Q4/2B	5,0
191154731	Computational Fluid Dynamics	Weide, van der, E.T.A.	Q4/2B	5,0

** This specialisation has aditional requirements. See www.utwente.nl/ap/*

Multidisiplinairy specialisations

Fluid Mechanics

Master programmes: Applied Physics & Mechanical Engineering

Course code	Name		Planning	EC
mandatory 1 of 2, not both due to overlap;				
193570010	Advanced fluid mechanics	Huisman	Q1/1A	5,0
201500136	Fluid Mechanics II	Ströer, P.	Q1/1A	5,0
Mandatory;				
193580020	Experimental Techniques in Physics of Fluids	Marin, A.	Q3/2A	5,0
Electives 1 of;				
201800083	Advanced colloids and interfaces	Wood, J.A.	Q1/1A	5,0
191157750	Engineering Acoustics	Wijnant, Y.H.	Q1/1A	5,0
202000245	Experimental methods in Fluid and Thermal Engir	Smink, J.S.	Q1/1A	5,0
201900074	Fundamentals of Numerical Methods	Weide, van der, E.T.A.	Q1/1A	5,0
202200103	Image processing and computer vision	Niu, K.	Q1/1A	5,0
191560430	Nonlinear dynamics	Meijer, H.G.E.	Q1/1A	5,0
201500024	Advanced Thermodynamics [1]	Otter, den, W.K.	Q2/1B	5,0
201900091	Advanced Topics in Finite Element Methods	Perdahcioglu, E.S.	Q2/1B	5,0
193565000	Capillarity phenomena	Snoeijer, J.H.	Q2/1B	5,0
191154720	Fluid Mechanics of Turbomachines 1	Withag, J.A.M.	Q2/1B	5,0
202200266	Hydrogen Technology	Rajamani, K.	Q2/1B	5,0
201800327	Ion Transport in Fluids	Wood, J.A.	Q2/1B	2,5
193572010	Physics of bubbles	Versluis, M.	Q2/1B	2,5
193580010	Turbulence	Stevens, R.J.A.M.	Q2/1B	5,0
191154340	Gasdynamics	Hirschberg, L.	Q2/1B	5,0
202000244	Aircraft & Wind Turbine Aerodynamics	Garrel, van, A.	Q3/2A	5,0
202001436	Biofluid Dynamics	Jain, K.	Q3/2A	5,0
201400194	Granular matter	Meer, van der, R.M.	Q3/2A	5,0
193400121	Nano-fluidics	Sirentanu, I.	Q3/2A	5,0
202001413	Soft matter physics	Vutukuri, H.R.	Q3/2A	5,0
191155730	Tribology	Osara, J.A.	Q3/2A	5,0
201700218	Turbulent Combustion	Kok, J.B.W.	Q3/2A	5,0
201100254	Advanced computer vision and pattern recognitior	Spreeuwers, L.J.	Q4/2B	5,0
202300225	Basics of acoustics & aero-acoustics	Hirschberg, L.	Q4/2B	5,0
201500405	Complex function theory	Weele, van der, M.C.	Q4/2B	3,0
191154731	Computational Fluid Dynamics	Weide, van der, E.T.A.	Q4/2B	5,0
201400300	Multiphase Flows	Jarray, A.	Q4/2B	5,0
201800131	Numerical Methods for Engineers	Lammertink, R.G.H.	Q4/2B	5,0
201700024	Wind Energy	Garrel, van, A.	Q4/2B	5,0

[1] *Due to overlap in the B-TN programme, not available for M-AP students*

Materials Science and Engineering

Master programmes: Applied Physics, Chemical Science and Engineering, Mechanical Engineering

Course code	Name		Planning	EC
193700010	Characterization	Wenderich, K.	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C.	Q3/2A	5,0
193550020	Surfaces and Thin Layers	Wormeester,H.	Q3/2A	5,0
202100319	Phase transformations in manufacturing	Bor, T.C.	Q4/2B	5,0