

**Master's curriculum Applied Physic 2025-2026**

For students enrolled in academic year 2025-2026

First year (M1)				
Course code	Name	Examiner	Planning	EC
<b>Compulsory courses</b>				<b>20</b>
202200093	Quantum Mechanics 2	Leppert	Q1/1A	5,0
201900080	Mathematical and Numerical Physics	Stevens	Q2/1B	5,0
191470241	Heat and Mass Transfer	Maass	Q3/2A	5,0
201900282	Small Signals and Detection	Marpaung	Q4/2B	4,0
201900281	Ethical and Cultural Awareness	Offerhaus	Q4/2B	1,0
<b>Electives</b>				<b>10/20</b>
	Electives physics/technical			10,0
	Free electives master's level <sup>1</sup>			0/10
<b>Specialisation courses. (See page 2 onwards.)</b>				<b>20</b>

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

<sup>1</sup> 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**

<b>Photonics</b>				
<i>AQO (Pinkse), BMPI (Steenbergen) IOS (Garçia Blanco) NLNP (Marpaung)</i>				
Course code	Name	Examiner	Planning	EC
<b>Mandatory Applied Nanophotonics</b>				
202200044	Fundamentals of Photonics	Saive, R.	Q1/1A	5,0
<b>Tracks Applied NanoPhotonics</b>				
<b>Biomedical Optics</b>				
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
<b>Integrated Optics</b>				
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
<b>Light and Matter Interaction</b>				
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	<del>Q4-2B</del>	<del>5,0</del>
202200047	NanoPlasmonics	lin, Q.	Q4/2B	5,0
<b>Quantum Optics</b>				
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
<b>Recommended electives Applied NanoPhotonics</b>				
-	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

<b>Materials</b>				
<i>CCP (Filippi), EMS (van Oort), ICE (Hilgenkamp), IMS (Rijnders), PIN (Zandvliet), QTM (Brinkman), XUV (Ackermann),</i>				
Course code	Name	Examiner	Planning	EC

<b>Energy Materials &amp; Systems (EMS)</b>				
193530000	Introduction to Superconductivity	Dhalle	Q1/1A	5,0
201100214	Applications of Superconductivity	Dhalle	Q2/1B	5,0
202400605	Cooling Science and Technology	Vanapalli	Q4/2B	5,0
<b>Recommended electives EMS</b>				
193570010	Advanced Fluid Mechanics	Huisman	Q1/1A	5,0
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193565000	Capillarity Phenomena	Snoeijer	Q2/1B	5,0
201700026	Electrical Power Engineering and System Integrat	Dhalle	Q2/1B	5,0
193530040	Introduction to High Energy Physics <sup>3</sup>	du Pree	Q3/2A	5,0
193550020	Surfaces and Thin Layers	Wormeester	Q3/2A	5,0
193580020	Experimental Techniques in Physics of Fluids	Marin	Q3/2A	5,0
201400037	Linear Solid Mechanics	Rege	Q3/2A	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	<del>Q4/2B</del>	<del>5,0</del>
201800131	Numerical Methods for Engineers	Lammertink	Q4/2B	5,0

<sup>2</sup> The course ASSP will not take place in academic year 2025. A recommended replacement course is 202500546 Advanced Condensed Matter Physics.

<sup>3</sup> From academic year 2025 programmed in educational block Q3/2A. Till academic year 2024 the course was programmed in Q2/1B

<b>Computational Chemical Physics (CCP)</b>				
193570050	Advanced Quantum Mechanics	Filippi	Q2/1B	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	Q4/2B	5,0
202100210	Electronic Structure Theory ( <i>Self-study course</i> ) <sup>6</sup>	Leppert	Year	5,0
<i>Recommended electives CCP</i>				
202000694	Classical Mechanics	Filippi	Q1/1A	4,0
202100078	Quantum Information	Pinkse	Q1/1A	5,0
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
202100223	Computational Physics	Filippi	Q3/2A	2,5/5,0
202100224	Machine Learning	Bokdam	Q3/2A	3,0/5,0
201500405	Complex Function Theory	Zwart	Q4/2B	3,0

<b>Industrial Focus Group XUV Optics (XUV)</b>				
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester	Q3/2A	5,0
202300191	X-rays for Science and Technology	Ackermann	Q4/2B	5,0
<i>Electives 1 of 3</i>				
193700010	Characterisation	Wenderich	Q1/1A	5,0
202200044	Fundamentals of Photonics	Saive, R.	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C	Q3/2A	5,0
<i>Recommended elective courses, the aforementioned 3 plus:</i>				
193570050	Advanced Quantum Mechanics	Leppert	Q2/1B	5,0
191210730	Fabrication of Micro- and Nanodevices	Kovalgin	Q2/1B	5,0
201900042	Nanomaterials Research	Beld, van den	Q4/2B	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	Q4/2B	5,0

<b>Inorganic Materials Science (IMS)</b>				
193700010	Characterisation	Wenderich	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C.	Q3/2A	5,0
<i>Electives 1 of 3</i>				
202200044	Fundamentals of Photonics	Saive, R	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester	Q3/2A	5,0
201700025	Solar Energy	Saive, R.	Q3/2A	5,0
<i>Recommend elective courses IMS</i>				
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle	Q1/1A	5,0
202200295	Laser Physics and Nonlinear Optics	Slot, van der	Q2/1B	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	Q4/2B	5,0

<b>Interfaces and Correlated Electron Systems (ICE)</b>				
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle	Q1/1A	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	Q4/2B	5,0
<i>Recommended electives courses ICE</i>				
202100078	Quantum Information	Pinkse	Q1/1A	5,0

<b>Physics of Interfaces and Nanomaterials (PIN)</b>				
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193550020	Surfaces and Thin Layers	Wormeester	Q3/2A	5,0
<del>201500167</del>	<del>Modern Topics in Condensed Matter Physics<sup>5</sup></del>	<del>Bampoulis</del>	Q4/2B	5,0
202500546	Advanced Condensed Matter Physics <sup>5</sup>	Bampoulis	Q4/2B	5,0

<sup>2</sup> The course ASSP will not take place in academic year 2025. A recommended replacement course is 202500546 Advanced Condensed Matter Physics.

<sup>5</sup> The course 201500167 MTCMP is replaced by 202500546 Advanced Condensed Matter Physics.

<sup>6</sup> The course EST is not offered in 25-26. from 26-27 it will be offered in quartile 4 (2B)

**Quantum Transport in Matter (QTM)**

193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle	Q1/1A	5,0
<i>Recommended elective courses QTM</i>				
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	<del>Q4/2B</del>	<del>5,0</del>
202100078	Quantum Information	Pinkse	Q1/1A	5,0

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

<b>Physics of Complex Fluids (PCF)</b>				
<b>Course code</b>	<b>Name</b>	<b>Examiner</b>	<b>Planning</b>	<b>EC</b>
193565000	Capillarity Phenomena	Snoeijer	Q2/1B	5,0
193400121	Nano-Fluidics	Sîretanu	Q3/2A	5,0
202001413	Soft Matter Physics	Vutukuri	Q3/2A	5,0
	- Course in consultation with Chair			
<i>Recommended elective courses:</i>				
201800083	Advanced Colloids and Interfaces	Wood	Q1/1A	5,0
193570010	Advanced Fluid Mechanics	Huisman	Q1/1A	5,0

<sup>2</sup> The course ASSP will not take place in academic year 2025. A recommended replacement course is 202500546 Advanced Condensed Matter Physics.

**Applied Physics focus specialisations**

<b>Quantum Electronics</b>				
<i>Research groups: CCP (Filippi), ICE (Hilgenkamp), NE (Wiel, van der), PIN (Zandvliet), QTM (Brinkman)</i>				
Course code	Name		Planning	EC
202100078	Quantum Information	Pinkse	Q1/1A	5,0
193570050	Advanced Quantum Mechanics	Leppert	Q2/1B	5,0
<i>Quantum Electronics Electives 10 EC of;</i>				
193530010	Nanophysics	Zandvliet	Q1/1A	5,0
193530000	Introduction to Superconductivity	Dhalle	Q1/1A	5,0
193530040	Introduction to High Energy Physics <sup>4</sup>	du Pree	Q3/2A	5,0
193400141	Nano-Electronics	Wiel, van der	Q2/1B	5,0
<del>202400780</del>	<del>Advanced Solid State Physics<sup>2</sup></del>	<del>Leppert, L.</del>	<del>Q4/2B</del>	<del>5,0</del>
<del>202100210</del>	<del>Electronic Structure Theory<sup>5</sup></del>	<del>Leppert</del>	<del>Year</del>	<del>5,0</del>

<sup>2</sup> The course ASSP will not take place in academic year 2025. A recommended replacement course is 202500546 Advanced Condensed Matter Physics.

<sup>4</sup> From academic year 2025 programmed in educational block Q3/2A. Till academic year 2024 the course was programmed in Q2/1B

<sup>5</sup> The course EST is not offered in 25-26. From 26-27 it will be offered in quartile 4 (2B)

<b>Quantum Optics</b>				
<i>Research groups: AQO (Pinkse), NLNP (Marpaung), IOS (García Blanco), OS (Offerhaus), HMOE (Nijhuis)</i>				
Course code	Name		Planning	EC
202100078	Quantum Information	Pinkse	Q1/1A	5,0
193570050	Advanced Quantum Mechanics	Filippi	Q2/1B	5,0
<i>Quantum Optics Electives 10 EC of;</i>				
202200044	Fundamentals of Photonics	Saive	Q1/1A	5,0
202100083	Quantum Optics	Pinkse	Q2/1B	5,0
191210880	Integrated Optics	Garcia Blanco	Q3/2A	5,0

<b>Digitizing Physics / Machine Aided Physics*</b>				
<i>Research groups: tbd</i>				
Course code	Name		Planning	EC
<i>Recommended electives</i>				
202200103	Image Processing and Computer Vision	Abayazid	Q1/1A	5,0
202100223	Computational Physics	Filippi	Q3/2B	5,0
202100224	Machine Learning	Bokdam	Q3/2B	3,0/5,0
202100225	Remote Control of Experiments	Verschuur	Q3/2B	2,5/5,0
201800131	Numerical Methods for Engineers	Lammertink	Q4/2B	5,0
201100254	Advanced Computer Vision and Pattern Recogniti	Spreeuwiers	Q4/2B	5,0
191154731	Computational Fluid Dynamics	Weide, van der	Q4/2B	5,0

\* This specialisation has additional requirements. See [www.utwente.nl/ap/](http://www.utwente.nl/ap/)

**Multidisciplinary specialisations**

<b>Fluid Mechanics</b>				
<i>Master programmes: Applied Physics &amp; Mechanical Engineering</i>				
Course code	Name		Planning	EC
<b>mandatory 1 of 2, not both due to overlap;</b>				
193570010	Advanced fluid mechanics	Huisman	Q1/1A	5,0
201500136	Fluid Mechanics II	Ströer	Q1/1A	5,0
<b>Mandatory;</b>				
193580020	Experimental Techniques in Physics of Fluids	Marin	Q3/2A	5,0
<b>Electives 1 of;</b>				
201800083	Advanced colloids and interfaces	Wood	Q1/1A	5,0
191157750	Engineering Acoustics	Wijnant	Q1/1A	5,0
202000245	Experimental methods in Fluid and Thermal Engin	Sanders	Q1/1A	5,0
201900074	Fundamentals of Numerical Methods	Weide, van der	Q1/1A	5,0
202200103	Image processing and computer vision	Abayazid	Q1/1A	5,0
191560430	Nonlinear dynamics	Meijer	Q1/1A	5,0
201500024	Advanced Thermodynamics	Otter, den	Q2/1B	5,0
201900091	Advanced Topics in Finite Element Methods	Perdahcioglu	Q2/1B	5,0
193565000	Capillarity phenomena	Snoeijer	Q2/1B	5,0
191154720	Fluid Mechanics of Turbomachines 1	Withag	Q2/1B	5,0
202200266	Hydrogen Technology	Rajamani	Q2/1B	5,0
201800327	Ion Transport in Fluids	Wood	Q2/1B	2,5
193572010	Physics of bubbles	Versluis	Q2/1B	2,5
193580010	Turbulence	Stevens	Q2/1B	5,0
202000244	Aircraft & Wind Turbine Aerodynamics	Garrel, van	Q3/2A	5,0
202001436	Biofluid Dynamics	Jain	Q3/2A	5,0
201400194	Granular matter	Meer, van der	Q3/2A	5,0
193400121	Nano-fluidics	Sirentanu	Q3/2A	5,0
202001413	Soft matter physics	Vutukuri	Q3/2A	5,0
191155730	Tribology	Osara	Q3/2A	5,0
201700218	Turbulent Combustion	Kok	Q3/2A	5,0
201100254	Advanced computer vision and pattern recogniti	Spreeuwiers	Q4/2B	5,0
202300225	Basics of acoustics & aero-acoustics	Sanders	Q4/2B	5,0
201500405	Complex function theory	Zwart	Q4/2B	3,0
191154731	Computational Fluid Dynamics	Weide, van der	Q4/2B	5,0
191154340	Gasdynamics	Hirschberg	Q4/2B	5,0
201400300	Multiphase Flows	Jarray	Q4/2B	5,0
201800131	Numerical Methods for Engineers	Lammertink	Q4/2B	5,0
201700024	Wind Energy	Garrel, van	Q4/2B	5,0

<b>Materials Science and Engineering</b> <i>Master programmes: Applied Physics, Chemical Science and Engineering, Mechanical Engineering</i>				
<b>Course code</b>	<b>Name</b>		<b>Planning</b>	<b>EC</b>
193700010	Characterization	Wenderich	Q1/1A	5,0
193700040	Inorganic Materials Science	Beaumer, C	Q3/2A	5,0
193550020	Surfaces and Thin Layers	Wormeester	Q3/2A	5,0
202100319	Phase transformations in manufacturing	Bor	Q4/2B	5,0