Applied Physics master's programme 2024/2025

(See also the **Curriculum master AP** for the programme per cohort, all the Applied Physics curricula and the **Transitional arrangements AP**)

Compulsory courses

Quartile	Course Code	Course Name	EC
1A	202200093	Quantum Mechanics 2 (Leppert)	5.0
1B	201900080	Mathematical and Numerical Physics (Stevens)	5.0
2A	191470241	Heat and Mass Transfer (Krug)	5.0
2B	201900282	Small Signals and Detection (Marpaung)	4.0
2B	201900281	Ethical and Cultural Awareness (Offerhaus)	1.0
-	193599010 or 201700185	Internship (Velthuis)	20 or 30
-	201800344 201800345	Master's Assignment, Physical Aspects (De Beer) (20 EC) Master's Assignment, General Aspects (De Beer) (20 EC)	40

Specialisation courses Applied Physics

Quantum Physics

The Quantum Physics track consists of two tracks Quantum Electronics (QE) and Quantum Optics (QO)

Quartile	Code	Course	EC	Mandatory	Elective
1A	202100078	Quantum Information (Renema)	5	QE; QO	
	193530000	Introduction to Superconductivity (Dhalle)	5		QE
	193530010	Nanophysics (Zandvliet)	5		QE
1B	193570050	Advanced Quantum Mechanics (Brocks)	5	QE; QO	
	193510040	Theoretical Solid-State Physics (tbd)	5		QE
	193530040	Intro. to High Energy Physics (Du Pree)	5		QE
	193400141	Nano-Electronics (Van der Wiel)	5		QE
	202100083	Quantum Optics (Pinkse)	5		QO
	202200295	Laser Physics and Nonlinear Optics (Van der Slot)	5		QO
2A	191210880	Integrated Optics (Garcia Blanco)	5		QO
	202200048	Classical and Quantum Emitters (Vos)	5		QO
2B	200900066	Intro. to the Physics of Correlated Electrons (Golubov)	5		QE
	202100210	Electronic Structure Theory (Leppert)	5		QE

Last update: 10 July 2024

Applied Nano-Photonics

Quartile	Code	Course	EC	SC[1)]	RC[1)]
1A	202200044	Fundamentals of Photonics (Saive)	5.0	All ANP spec.	XUV
	202000663	Molecular Struct. and Spectr. (Huijser)	2.5	Bio	Quant., Int., LM.
	202100078	Quantum Information (Renema)	5.0	Quant.	Bio., Int., LM.
	202200046	Light and Matter (Saive)	5.0	LM	Bio., Int., Quant.
1B	202200295	Laser Physics Nonlinear Optics (Van der Slot)	5.0	Bio, Int.	Quant., LM.
	202100083	Quantum Optics (Pinkse)	5.0	Quant.	Bio., Int., LM.
2A	191210880	Integrated Optics (Garcia Blanco)	5.0	Int., Quant.	Bio., LM.
	202200045	Integrated Photonic Sys. and Exp.(Marpaung)	5.0	Int.	Bio., LM., Quant.
	202200048	Classical and Quantum Emitters (Vos)	5.0	LM	Bio., Int., Quant.
	201700034	Intro to Partial Differential Equations (Akkaya)	5.0		Bio., Int., LM., Quant.
2B	193500000	Biomedical Optics (Vellekoop)	5.0	Bio.	Quant., Int., LM.
	201500405	Complex Function Theory (Zwart)	3.0		Bio., Int., LM., Quant. CCP, PoF
	202200047	NanoPlasmonics (Nijhuis)	5.0	LM	Bio., Int., Quant.

Nano-Electronic materials

Quartile	Code	Course	EC	SC[1)]	RC[1)]
1A	193700010	AMM - Characterization (Huijser)	5.0	IMS, XUV, MS&E	NBP
	202000694	Classical Mechanics (Filippi)	4.0		CCP
	193530010	Nanophysics (Zandvliet)	5.0	ICE, PIN, QTM, XUV	EMS, IMS, CCP
	193530000	Intr. to Superconductivity (Dhalle)	5.0	EMS, ICE, QTM	IMS
1B	193570050	Advanced Quantum Mechanics (Brocks)	5.0	CCP	XUV
	191210730	Technology (Kovalgin)	5.0		XUV
	193510040	Theoretical Solid State Physics (tbd)	5.0	CCP, ICE, QTM	EMS, IMS, PIN, XUV
	201100214	Applications of Superconductivity (Dhalle)	5.0	EMS	
	201700026 m-set	Electr. Power Eng. and Sys. Integr. (Dhalle)	5.0		EMS
	193530040	Introduct. to High Energy Physics (Du Pree)[2)]	5.0		EMS
2A	193700040	AMM - Inorganic Materials Science (Baeumer)	5.0	IMS, XUV, MS&E	
	202100223	Computational Physics (Filippi)	5.0		CCP
	202100224	Machine Learning (Bokdam)	3-5		CCP
	201700025	Solar Energy (Singh)	5.0	IMS	
	193550020	Surfaces and Thin Layers (Wormeester)	5.0	IMS, PIN, XUV, MS&E	EMS
	201400037	Linear Solid Mechanics (Ellenbroek)	5.0		EMS
2B	202100210	Electronic Structure Theory (Leppert)	5.0	CCP	
	200900066	Intr. to the Physics of Corr. El. (Golubov)	5.0		CCP, ICE, PIN, QTM, IMS
	201500167	MTCMP (Bampoulis)	5.0	PIN	
	193570040	Theory of General Relativity[1] (TBD)	5,0		CCP
	202300191	X-ray Characterization for S&T (Makhotkin)	5.0	XUV	
	201900042	Nanomaterials Research (Van den Beld)	5.0		XUV
	202400605	Cooling Science and Technology (Vanapalli)	5.0	EMS	

Physics of Fluids

Quartile	Code	Course	EC	SC[1)]	RC[1)]
1A	193570010	Advanced Fluid Mechanics (Huisman)	5.0	PoF	EMS, PCF
	191560430	Nonlinear Dynamics (Spek)	5.0		PoF
1B	193572010	Physics of Bubbles (Versluis)	2.5		PoF
	193580010	Turbulence (Stevens)	5.0		PoF
	193565000	Capillarity Phenomena (Snoeijer)	5.0	PCF	BE, EMS, PoF
2A	193580020	Experimental Techniques in PoF (Marin)	5.0	PoF	EMS
	193400121	Nano-Fluidics (Siretanu)	5.0	BE, PCF	PoF
	201400194	Granular Matter (Van der Meer)	5.0		PoF
	202001413	Soft Matter Physics (Vutukuri)	5.0	BE, PCF	NBP, PoF
2B	201500405	Complex Function Theory (Zwart)	3.0		ANP, CCP, PoF
	191154731	Computational Fluid Dynamics[2] (v/d Weide)	5.0		PoF
	193542070	Medical Acoustics (Lajoinie)	5.0		PoF
	201800131	Numerical Meth. for Engineers[3] (Lammertink)	5.0		PoF, EMS

[1] Subject to change, this course may not be offered in 2024-2025
[2] Due to overlap, this course cannot be followed in combination with 201800131 Numerical Methods for Engineers
[3] Due to overlap, this course cannot be followed in combination with 191154731 Computational Fluid Dynamics

Soft Matter Multidisciplinary Specialisation AP-CSE

Quartile	Code	Course	EC	SC[1)]	RC[1)]
1A	201800083	Advanced Colloids and Interfaces (Wood)	5.0	SM	
	193640020	Biophysical Techn. and Mol. Imaging (Blum)	5.0		SM
	201700187	Soft and Biological Techniques (Duits)	5.0	SM	
1B	201800014	Electrochemistry: Fundamentals & Techniques	5.0		SM
2A	202001413	Soft Matter Physics (Vutukuri)	5.0	SM	PoF
	193730060	Polymer Physics (de Beer)	5.0		SM
	193400121	Nano-Fluidics (Siretanu)	5.0		SM
2B					

Materials, Science & Engineering Multidisciplinary Specialisation AP-CSE-ME

Quartile	Code	Course	EC	SC[1)]	RC[1)]
1A	193700010	Characterization (Huijser)	5.0	MS&E	
1B					
2A	193700040	AMM - Inorganic Materials Science (Baeumer)	5.0	MS&E, IMS, XUV	
	193550020	Surfaces and Thin Layers (Wormeester)	5.0	MS&E, IMS, PIN, XUV	EMS
2B	202100319	Phase transformations in manufacturing (Bor)	5.0	MS&E	

Fluid Mechanics Multidisciplinary Specialisation AP-ME

Quartile	**Code**	**Course**	**EC**	**SC[1)]**	**RC[1)]**
1A	193570010	Advanced Fluid Mechanics (Huisman)	5.0	FM, PoF	EMS, PCF
	201500136	Fluid Mechanics 2 (Ströer)	5.0	FM	
	201800083	Advanced colloids and interfaces (Wood)	5		FM
	191157750	Engineering Acoustics (Wijnant)	5		FM
	202000245	Experimental methods in Fluid and Thermal Engineering (Sanders)	5		FM
	201900074	Fundamentals of Numerical Methods (Weide, van der)	5		FM
	202200103	Image processing and computer vision (Abayazid)	5		FM
	191560430	Nonlinear dynamics (Meijer)	5		FM
1B	193572010	Physics of Bubbles (Versluis)	2.5		PoF
	193580010	Turbulence (Stevens)	5.0		PoF
	201500024	Advanced Thermodynamics (Otter, den)	5.0		FM
	201900091	Advanced Topics in Finite Element Methods (Perdahcioglu)	5.0		FM
	191154720	Fluid Mechanics of Turbomachines 1 (Withag)	5.0		FM
	202200266	Hydrogen Technology (Rajamani)	5.0		FM
	202300266	Ion Transport in Fluids (Wood)	2.5		FM
	193565000	Capillarity Phenomena (Snoeijer)	5.0	PCF	BE, EMS, PoF
2A	193580020	Experimental Techniques in PoF (Marin)	5.0	FM, PoF	EMS
	201800371	Aeroacoustics (Venner)	5.0		FM
	202000244	Aircraft & Wind Turbine Aerodynamics (Garrel, van)	5.0		FM

	202001436	Biofluid Dynamics (Jain)	5.0		FM
	191154340	Gasdynamics (Venner)	5.0		FM
	201400194	Granular Matter (Meer, van der)	5.0		FM
	193400121	Nano-Fluidics (Sirentanu)	5.0		FM
	202300266	Rheology & Processing of Thermoplastics (Drongelen, van)	5.0		FM
	202001413	Soft Matter Physics (Vutukuri)	5.0		FM
	191155730	Tribology (Osara)	5.0		FM
	201700218	Turbulent Combustion (Kok)	5.0		FM
2B	201500405	Complex Function Theory (Zwart)	3.0		FM, ANP, CCP, PoF
	191154731	Computational Fluid Dynamics[4] (v/d Weide)	5.0		FM, PoF
	201800131	Numerical Meth. for Engineers[5] (Lammertink)	5.0		FM, PoF, EMS
	201100254	Adv. Comp. Vision and Pattern Recognition (Spreeuwers)	5.0		FM
	201400300	Multiphase Flows (Jarray)	5.0		FM
	201700024	Wind Energy (Garrel, van)	5.0		FM

A Capita Selecta course is used for activities done in the chair, not belonging to regular courses. The content, form and size is in consultation with the chair. There is a form to register course code, name, ECs, subject, material used, assessment and a title.

[1)] SC is Specialization courses, RC is Recommended elective courses, see also Curriculum AP.
[2)] Students who want to participate in this course, please contact the teaching staff.
[3)] Soft and Biological Techniques requires previous knowledge, depending on your specific background. In addition, there is a maximum number of students that can participate. There is a maximum of student places. Please contact the teaching staff.

[4] Due to overlap, this course cannot be followed in combination with 201800131 Numerical Methods for Engineers
[5] Due to overlap, this course cannot be followed in combination with 191154731 Computational Fluid Dynamics