Applied Physics master's programme 2019/2020

(See also the Curriculum master AP for all the Applied Physics curricula and the Transitional arrangements AP)

Compulsory courses

Quarter	Course Code	Course Name	EC
1A	191411291	Applied Quantum Mechanics (Kelly)	5.0
1B	201900080	Mathematical and Numerical Physics (Kooij)	5.0
2A	191470241	Heat and Mass Transfer (Krug)	5.0
2B	201900282	Small Signals and Detection (Marpaung)	4.0
2B	201900281	Ethics and Cultural Awareness	1.0
-	193599010 or 201700185	Internship 20 EC or Internship 30 EC (Folkers)	20 or 30
-	201800344 201800345	Master's Assignment, Physical Aspects (Kooij) (20 EC) Master's Assignment, General Aspects (Kooij) (20 EC)	40

Fluid/Soft Matter courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	193570010	Advanced Fluid Mechanics (Huisman)	5.0	PoF	EMS, PCF
	201300135	Soft and Biological Matter (Lemay)	5.0	BE, NBP, PCF	CCP, PoF
	201700187	Soft and Biological Techniques (Duits)[2]	5.0		BE, NBP, PCF
	201800083	Advanced Colloids and Interfaces (Wood)	5.0		BE, PCF
1B	193580010	Turbulence (Lohse)	5.0	PoF	
	193572010	Physics of Bubbles (Versluis)	2.5	PoF	
2A	193580020	Experimental Techniques in PoF (Marin)	5.0	PoF	EMS
	193400121	Nano-Fluidics (Siretanu)	5.0	BE, PCF	PoF
	201400194	Granular Matter (v.d. Meer)	5.0	PoF	
	193542070	Medical Acoustics (Versluis)	5.0	BMPI, PoF	
2B	201400195	Fluids and Elasticity (Snoeijer)	2.5	PoF	
	193565000	Capillarity Phenomena (Mugele)	5.0	PCF, PoF	BE
-	201300137	Ions and Devices (Lemay)	5.0	BE	

Materials courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	193530010	Nanophysics (Zandvliet)	5.0	CMS, ICE, PIN, QTM, XUV	EMS, IMS
	193530000	Intr. to Superconductivity (Dhalle)	5.0	EMS, ICE, QTM	
	193700010	AMM - Characterization (Huijser)	5.0	IMS	NBP
1B	193510040	Theoretical Solid State Physics (Kelly)	5.0	CCP, CMS, ICE, QTM	COPS, EMS, IMS, PIN, XUV
	201100214	Applications of Superconductivity (Dhalle)	5.0	EMS	
	193400141	Nano-Electronics (v.d. Wiel)	5.0		OS
2A	193550020	Surfaces and Thin Layers (Wormeester)	5.0	IMS, PIN, XUV	EMS
	193510030	Electronic Structure Theory 2 (Brocks)[7]	5.0	CMS	
	193700040	AMM-Inorganic Materials Science (Koster)	5.0	IMS, XUV	
2B	201500167	MTCMP (van Houselt)	5.0	PIN	
	201100146	Cryogenic Science and Techn. (ter Brake)	5.0	EMS	
	200900066	Intr. to the Physics of Corr. El. (Golubov)	5.0		CCP, CMS, ICE, PIN, QTM
-	193510020	Electronic Structure Theory 1 (Kelly)[7]	5.0	CMS	

Optics courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	201300139	Laser Physics (Boller)	5.0	LPNO, OS	COPS, NBP
	193515000	Quantum Optics (Pinkse)	5.0	COPS	LPNO
	193400131	Nano-Optics (Garcia-Blanco)	5.0		NBP, OS
	193640020	Biophysical Techn. and Mol. Imaging (Otto)	5.0	NBP	BMPI
1B	193520030	Nonlinear Optics (Boller)	5.0	LPNO, OS	COPS
2A	201300141	Wave Optics (vd Slot)	5.0	BMPI, COPS, LPNO, OS	NBP, XUV
	201100074	Nanophotonics (Vos)	5.0	COPS	
	191210880	Integrated Optics (Garcia Blanco)	5.0	OS	
	193400111	Bionanotechnology (Bennink)	5.0		NBP
2B	193500000	Biomedical Optics (Vellekoop)	5.0	BMPI	
	201400196	Quantum Emitters (Vos)	5.0		COPS, NBP
-	201100075	Nanophotonic Experiments (Vos/Pinkse)[3]	5.0	COPS	
	193520040	Exp. Laser Physics and Nonlinear Optics	5.0	LPNO	COPS, NBP,

		(Bastiaens for LPNO / Offerhaus for OS)[3]			OS

General physics courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	201800166	Classical Mechanics (Filippi)[6]	4.0		
	193640060	Radiation Expertise (v. Dijk)[3]			
1B	193530040	Introduction to High Energy Physics (v. Eijk)	5.0		EMS
	193570050	Advanced Quantum Mechanics (Brocks)	5.0	CCP	COPS, CMS, XUV, LPNO
2A					
2B	193570040	Theory of General Relativity (v. Damme)			CCP
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Applied physics/engineering courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	201800338	Engineering Solid Mechanics (Schilder)[6]	4.0		
	201600180	Molecular Struct. and Spectr. (Huijser)[4]	2.5		OS
1B	191210730	Technology (Kovalgin)	5.0		XUV
	201700026	Electr.Power Eng. and System Integr. (Dhalle)	5.0		EMS
2A	191407051	Intr. to Instr.computers (Veugelers)	2.5/5		
	201400037	Linear Solid Mechanics (Ellenbroek)	5.0		EMS
	201700025	Solar Energy (Reinders)	5.0		
	193530050	Magn. Methods for (Neuro) Imaging (Haken)	5.0		
2B	201800114	Imaging Technology in Radiology (Simonis)	5.0		BMPI
	201700024	Wind Energy (Venner)	5.0		
-	191211000	Advanced Semiconductor Devices (Salm)[3]	5.0		
	200900068	CS Advanced X-ray Scattering	-		IMS

Mathematics courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	191560430	Nonlinear Dynamics (Meijer)	5.0		PoF
1B	191551150	Numerical Techniques for PDE	5.0		
2A	201700034	Introduction to PDE (Akkaya)	5.0		COPS
2B	201800131	Numerical Methods for Engineers	5.0		PoF
	191154731	Computational Fluid Dynamics	5.0		PoF
	201500405	Theory of Complex Functions (Jeurnink)	3.0		COPS, CMS, LPNO, OS, PoF

Computer/Programming courses

Quarter	Code	Course	EC	SC[1]	RC[1]
1A	201600070	Basic Machine Learning	5.0		
	191158510	Programming in Engineering	3.0		
	201400174	Data Science	5.0		
1B	201600071	Advanced Machine Learning	5.0		
	201800177	Deep Learning	5.0		
	192140200	Algorithms, Datastructures and Complexity	5.0		
	201400174	Data Science	5.0		
	201200044	Managing Big Data	5.0		
	191158500	Advanced Programming in Engineering	5.0		
2A	201700176	Computational Physics 1 (Filippi)	2.5	CCP	
	201700177	Computational Physics 2[5] (Filippi)	2.5	CCP	
	191210910	Image Processing and Computer Vision	5.0		BMPI
	201800482	Machine Learning	3/5		
	201400174	Data Science	5.0		
2B	201100254	Adv. Comp. Vision and Pattern Recognition	5.0		BMPI
	201500583	Machine Learning for Medical Applications	1.5		BMPI

The curriculum of Applied Physics contains 20 EC elective courses. The elective courses can be specialization courses of another research group listed in the Applied Physics master's programme. The elective courses can be courses of other departments (see website of this department) or extra courses given by Applied Physics listed above. The curriculum of Applied Physics contains for every research group a list of recommended (elective) courses. The recommended courses of other departments are also listed above. For these students who want to extend the internship to 30 EC, the 10 EC elective courses free can be used.

A Capita Selecta course is used for activities done in the chair not belonging to regular courses. The content, form and size is 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.

[1] SC is Specialization courses, RC is Recommended courses, see also Curriculum AP.

2) Soft and Biological Techniques can only be done in combination with Soft and Biological Matter. There is a maximum of student places. Please contact the teaching staff.

3) Students who want to participate in this course, please contact the teaching staff.

4) Part of AT Module 09 Condensed Matter Physics (201800130)

5) Computational Physics 1 is pre knowledge for Computational Physics 2

6) This course is part of the bachelor TN module M05 Signals, Models en Systems, course code 201800159. To participate in this course/module part you have to register for the whole module. The schedule can be found on the module code.

7) Electronic structure 1 and 2 can be done independently. Electronic Structure 1 is not preknowledge for Electronic Structure 2.