

**IMPLEMENTATION REGULATIONS
additional to the Teaching and Examination Regulations for the
Master programme "Applied Physics"**

**Delft University of Technology
2010-2011**

Changes with regard to the implementation regulations master programme Applied Physics 2009-2010

	All articles are renumbered
	Specialisations (except R&D), special programmes and programme additions should be submitted to the Board of Examiners after approval by the coordinators
Nieuw Article 9 Transition ruling	Since January 2010, the department of nanoscience has been split into two new departments: bionanoscience and quantum nanoscience. Thereby two new tracks have replaced the old nanoscience track. Students who have started their master before 2010 within the nanoscience track, will be awarded a diploma for either the quantum nanoscience or the bionanoscience track. D-list courses for the nanoscience track will be automatically accepted for these two new tracks.
New specialisation	2.7 Casimir specialisation (Cas)
New special programme	3.3 Casimir pre-PhD

Section 1 CORE MODULES AND SPECIALISATIONS

The programme Applied Physics is a two-year master programme and comprises 120 EC. The programme has a core-specialisation structure. Within this structure, there is a choice of research tracks. The core programme comprises 90 EC and has the same structure for all Master students.

Combining the core programme with a 30 EC specialisation completes the master programme. Courses that form part of the students bachelor programme cannot be part of the master programme

Tracks

The tracks within the core programme correspond to the faculty's five physics departments:

- Imaging Systems and Technology (IST)
- Multiscale Physics (MSP)
- Quantum Nanoscience (QNS)
- Bionanoscience (BNS)
- Radiation, Radionuclides and Reactors (R³)

Specialisations

Seven specializations of 30 EC each can be chosen. These specialisations sometimes imply restrictions on the core programme. The restrictions will be described in detail below.

1. Research and Development (R&D)
2. Astronomy and Instrumentation (AI)
3. Sustainability in Technology (SiT)
4. Education
5. Management of Technology (MoT)
6. Annotation in Entrepreneurship (AE)
7. Casimir specialisation (Cas)

Special programmes

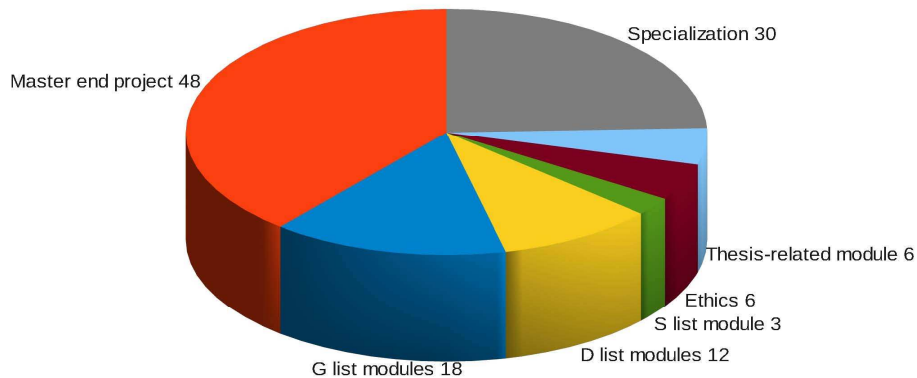
Special programmes within Applied Physics are:

- The Erasmus Mundus programme Optics in Science and Technology (OpSciTech): This programme consists of one year spent at Delft University of Technology and one year spent at one of the partner universities.
- Nuclear Science and Engineering (NSE): This is a special programme *within* the R3 core programme combined with the R&D specialization. The master thesis and the internship have to be done within the field of NSE.
- Casimir pre-PhD: This programme, which is linked to the Casimir specialisation, focuses on educating students for a PhD position and is designed to respond to the increased mobility of students after their BSc.

Programme additions

- Honours track: This is an individual programme for talented students.
- Double degree programme: This is a three year programme Applied Physics – Management of Technology of the Faculties of Applied Sciences and Technology, Policy and Management.

The core programme¹



G = General; D = Departmental; S = Society-related; R = Research section; M = Math

Article 1 Tracks

1.1 General list (G-list): 18 EC must be chosen from the 'G' list, the advanced modules aim at breadth as well as depth in general physics and mathematics knowledge, following on from the Bachelor's programme. At least one mathematics subject and two physics subjects must be chosen from this list. The mathematics subjects are the last three options in the table below.

Module Code, Module title, EC
AP3011 G Chaotic processes, 6
AP3021 G Advanced Statistical Mechanics, 6
AP3032 G Continuum Physics, 6
AP3051 G Advanced Quantum Mechanics, 6
AP3061 G Advanced Wave Propagation, 6
AP3071 G Advanced Electrodynamics, 6
AP3081 G International Master's Course on Computational Physics, 6
AP3091 G Elementary Particles, 6
WI4014TU Numerical Analysis, 6
WI4143TN Complex Analysis, 6
WI3150TU + WI4150TU Partial Differential Equations I + II, 3 + 3

¹ The programme for students who have started their Master in Applied Physics in 2003-2004 or later

1.2 Departmental list (D-list): 12 EC must be chosen from the 'D' list of technical and science subjects relating to departments IST, MSP, QNS, BNS and R³.

D-list courses are more specialised than G-list courses. They are in most cases representative for the research areas of one of the physics departments, although some D-list courses combine research areas of more than one department. The latter are denoted "Interdepartmental". The student must choose at least one module that belongs to the department of his or her choice.

Module Code, Module title, EC, Department
AP3141 D Environmental Physics, 6, interdepartmental
TNxxxxUL General Theory of Relativity, 6, interdepartmental
AP3671 D Optical Wave Guiding, Photonic Crystals and Optical Functions, 6, interdepartmental
AP3111 D Quantum Electronics and Lasers, 6, IST
AP3121 D Imaging Systems, 6, IST
AP3231TU Medical Imaging, 6, IST
AP3171 D Advanced Physical Transport Phenomena, 6, MSP
AP3181 D Applied Multiphase Flow, 6, MSP
WB1422A TU Advanced Fluid Dynamics A, 6, MSP
WB1424A TU Turbulence A, 6, MSP
NS3501 Nanotechnology, 6, QNS
NS3521TU Mesoscopic Physics, 6, QNS
NS3571TU Quantum Transport, 6, QNS
AP3211 D Advanced Solid State Physics, 6, QNS
AP3191 D Physics of Semiconductor Nanodevices, 6, QNS
AP3511TU D Molecular Biophysics, 6, BN
AP3161 D Cellular Dynamics: Stochasticity, Signalling and Evolution, 6, BN
AP3351 D Radiation Detection and Medical Imaging, 6, R3
AP3371 D Radiological Health Physics, 6, R3
AP3341 D Nuclear Reactor Physics, 6, R3
AP3311 D Condensed Matter: Scattering, Structure and Dynamics, 6, R3
CH3721 Nuclear Chemistry, 6, R3

1.3 Ethics: 3 EC of a module on Ethics compulsory (+3 optional)

WM0320TU Ethics for Engineering, 3

1.4 Societal list (S-list): 3 EC must be chosen from the 'S list' of Society-related topics (this may be an extension of the Ethics module to 6 EC or a module offered by the faculty of Technology, Policy and Management with a WM code. The S-list can be found at:

http://www.studiegids.tudelft.nl/a101_displayProgram.do?program_id_with_context=4125

1.5 Thesis related electives from G, D, R and M list: 6 EC chosen freely from subjects within or outside of the faculty, under the condition that the thesis supervisor gives permission. Possible subjects include those from the 'G', 'D', 'R' or 'M' list. Subjects on the R list are highly specialised research topics. Subjects on the M list are mathematical topics which may be of interest for different research groups. If, following the advice of his or her supervisor, a student wishes to follow a subject that is not on the G, D, R or M lists, prior approval should be obtained from the Board of Examiners.

Research list (R-list)

Module Code, Module title, EC, Department/Section
AP3521 Sound control, 6, IST-AK
AP3531 Acoustical imaging, 6, IST-AK
AP3401 Introduction to charged particle optics, 6, IST-DO
AP3381 Theoretical optics, 6, IST-OP
AP3391 Geometrical optics, 6, IST-OP
AP3601 Optical Fabrication Technology, 6, IST-OP
ET4283 Advanced digital image processing, 6, IST-QI
WB2433-03 Humanoid Robots, 6, IST-QI
IN4085 Pattern recognition, 6, IST-QI
AP3551 Computational multiphase flow, 6, MSP
AP3561 Turbulent reacting flows, 6, MSP
AP3571 Radiative Heat Transfer, 6, MSP
CH3052 Applied Transport Phenomena, 6, MSP
WB1428 Computational fluid dynamics, 4 (1 + 3), MSP
WB1429-03 Microfluidics, 3, MSP
NS3531 Molecular electronics, 6, QNS
NS3621 Quantum Information Processing, 6, QNS
AP3651 Electronics for Physicists, 6, QNS
NS3661 Quantum Entanglement, 6, QNS
AP3681 Fairy Tales of Theoretical Physics, 6, QNS
NS3131 Biomolecular motors, 6, BN
NS3161 Advanced biophysics, 6, BN
AP3321 Special topics in nuclear reactor physics, 6, R3-PNR
AP3631 Kinetics and Dynamics of Nuclear Reactors, 3, R3-PNR
AP3641 Nuclear Thermal Hydraulics, 3, R3-PNR
AP3361 Medical physics & radiation technology: imaging, 6, R3-RDM/RIH
AP3581 Medical physics & radiation technology: radiotherapy, 6, R3-RDM/RIH
AP3241TU Particle Therapy Holland, 6, R3-RDM
SC4025 Control theory, 6, DCSC
SC4110 System Identification, 5, DCSC
SC4120 Special Topics in Signal processing & control, 3, DCSC
SC4170 Inverse problems and statistical signal processing, 6, DCSC

Mathematical list (M-list)

Module Code, Module title, EC
WI4005 Wavelets, 6
WI4006 Special functions, 6
WI4037TU Tensor Analysis, 4
WI4211 Advanced Topics in Analysis, 6

1.6 Master's thesis work: to a total of **48 EC** in a research section of one of the physics departments IST, MSP, QNS, BNS, R³, including affiliated groups (such as the Fluid Dynamics section or the Delft Centre for Systems and Control, both in the Department of Mechanical Engineering), or in another group within or outside of TU Delft.

The prior approval of the Board of Examiners should be obtained if the thesis work is performed outside one of the physics departments IST, MSP, QNS, BNS, R³, including affiliated groups. The Board of Examiners may then appoint a supervisor from one of the physics departments.

For the Casimir specialisation, the master thesis work has a different structure, see below.

Article 2 Specialisations

All specialisations consist of 30 EC.

2.1 Research and Development (R&D)

18 EC internship in a R&D institution, preferably in industry or a research institution outside of TU Delft.
6 EC , freely chosen from the G, D, R or M lists.
6 EC , freely chosen from subjects within or outside of the faculty, under the condition that the thesis supervisor gives his or her permission. Possible modules include those from the G, D, R or M list.
If, following the advice of his or her supervisor, a student wishes to take a module that does not appear on these lists, prior approval should be obtained from the Board of Examiners.
Advice can be given by the programme director of Applied Physics

2.2 Astronomy and Instrumentation (AI)

This specialisation is a joint undertaking of the Observatory of Leiden University and the Faculty of Applied Sciences of TU Delft. The master thesis project should be related to astronomical research or some other form of space research. The programme should be submitted to the Board of Examiners after approval by the AI coordinator, Prof. dr. ir. T.M. Klapwijk.

2.3 Sustainability in Technology (SiT)

This is a university initiative. Approval of the Master's thesis work and the internship by the faculty's advisor on sustainability is needed. The programme should be submitted to the Board of Examiners after approval by the faculty's advisor on sustainability, Prof. dr. ir. C.R. Kleijn.

18 EC internship within a R&D institution AP3921 preferably in industry or a research institution outside of TU Delft. The internship should have a clear relation to sustainability
A set of modules of 11 EC : <ul style="list-style-type: none"> • AP3141 D Environmental Physics 6 EC, Multiscale Physics D list (this cannot be a substitute of the core D list choices) • 5 EC chosen from the cluster B list. This list can be found at www.tudelft.nl/tisd
Approval of the Master's thesis work by the faculty's advisor on sustainability. A colloquium – WM0922TU Technology in Sustainable Development 1 + 3 EC is part of the thesis work.

2.4 Education (in Dutch)

The specialisation consists of Basisdeel/Education 1 (30 EC) and Verdiepingsdeel/Education 2 (30 EC). If a student has done the minor Education, only the Verdiepingsdeel/Education 2 of 30 EC remains.

The minor Education can be done during the bachelor programme and leads to certification as a *tweedegraads* secondary school teacher with limited qualification ('beperkte bevoegdheid').

The combination of the minor Education/basisdeel Education 1 and Education 2 leads to certification as a fully-qualified *eerstegraads* [*grade-one*] secondary school teacher. The certificate will be attached to the diploma.

The language used in this specialisation is Dutch because of the fact that it prepares for a teacher's position in the Netherlands and because it includes internships ('Schoolpracticum') at Dutch schools.

The programme should be submitted to the Board of Examiners after approval by the Education programme coordinator M.A.F.M. Jacobs.

2.5 Management of Technology (MoT)

This specialisation is offered by the faculty of Technology, Policy and Management. The programme consists of either the first semester or the second semester of the MSc Management of Technology. The programme should be submitted to the Board of Examiners after approval by the MoT programme coordinator Dr. W.M. de Jong.

2.6 Annotation in Entrepreneurship (AE)

The student makes a proposal for the courses to be followed and for the final thesis. He will discuss the proposal with the coordinator of the Delft Centre for Entrepreneurship (DCE), dr. ir. M.A. van Veelen. The programme should be submitted to the Board of Examiners after approval by the programme coordinator.

The Annotation in Entrepreneurship (AE) certificate will be granted during the graduation ceremony.

Courses on entrepreneurship 20 EC
WM 4001TU the Entrepreneurship Annotation Week 2 EC
WM4003TU the Annotation Entrepreneurship Final Thesis 8 EC

2.7 Casimir specialisation

This specialisation implies participation in the special Pre-PhD programme described in detail in subsection 3.3. The specialization contains:

Research proposal 8 EC
Optional courses, at least one from the foundational list, the others from the foundational, topical or methods list 18 EC
4 EC is the part of the research projects exceeding the standard 48 EC

A selection procedure takes place before entrance into this special programme.

Article 3 Special programmes

3.1 The Erasmus Mundus programme Optics in Science and Technology (OpSciTech)

This programme is an Erasmus Mundus programme jointly given by TU Delft and partner universities, i.e. Friedrich Schiller University Jena (Germany), Université Paris-Sud 11/Institut d'Optique Graduate School (Paris, France), Warsaw University of Technology (Poland) and Imperial College London (United Kingdom). The course consists of one year spent at Delft University of Technology and one year spent at one of the partner universities. Participation in the EMM programme should be submitted to the Board of Examiners after approval of Dr. F. Bociort.

The **first year** of the EMM programme TU Delft consists of:

Code	Name	EC	
G-physics list		= General optical physics courses	
AP3061 G	Advanced Wave Propagation	6	<i>Compulsory</i>
AP3071 G	Advanced Electrodynamics	6	<i>Compulsory</i>
G-math list		= General mathematics courses	
		<i>Choose at least 6 EC</i>	
WI4014TU	Numerical Analysis	6	
WI4143TN	Complex Analysis	6	
WI3150TU + WI4150TU	Partial Differential Equations I + II	3+3	
S-list		= Societal/Non-technical courses	
WM0320TU	Ethics for Engineering	3	<i>Compulsory²</i>
	English (level depending on intake test)	3	<i>Compulsory³</i>
D-list		= Courses at the Department of IST	
		<i>Choose at least 12 EC</i>	
AP3111 D	Quantum Electronics and Quantum Optics	6	
AP3121 D	Imaging Systems	6	
AP3671 D	Optical Wave Guiding Photonic Crystals and Optical Functions	6	
AP2231TU D	Medical Imaging	6	
R-list		= Research course modules	
		<i>Choose at least 12 EC⁴</i>	
AP3401	Introduction to charged particle optics	6	
AP3381	Theoretical optics	6	
AP3391	Geometrical optics	6	
AP3601	Optical Fabrication Technology	6	
ET4283	Advanced Digital Image Processing	4	
WB2433	Humanoid Robots	3	
IN4085	Pattern recognition	6	
AP3361	Medical Physics & Radiation Technology: Imaging	6	
Project		= Practical research project	
AP3941	Research project in the Department of IST	12	<i>Compulsory</i>

The **second year** of the EMM programme TU Delft consists of:

- A free choice of 12 EC from the G, D or R lists below, or the M-list from the master programme Applied Physics
- The master thesis AP3901 of 48 EC

² The course Ethics for Engineering is offered twice a year, in the first and third period.

³ For a native English speaker or someone who wants support in another language, it is possible to take courses in another language, such as German or French. This should be approved by the Delft OpSciTech coordinator. For more information on S-list modules please consult http://www.studiegids.tudelft.nl/a101_displayProgram.do?program_id_with_context=4125

⁴ Should be approved by the internship supervisor

3.2. Nuclear Science and Engineering (NSE)

Nuclear Science and Engineering may have a focus on either "health" or on "energy". Health and Energy are the main areas of research of the Department R3. NSE **is a special choice of courses within** the core programme with an R3 track of 90 EC and a R&D-specialisation of 30 EC. The master thesis and the internship also have to be done within the field of NSE.

Participation in the NSE special programme should be submitted to the Board of Examiners after approval by Prof. dr. H.T. Wolterbeek.

Core courses (90 EC)
18 EC G-courses
12 EC D-courses (selected from list below)
6 EC G,D,R courses (selected from list below)
3 EC WM0320TU Ethics
3 EC S courses
48 EC master thesis work within NSE
R&D-specialisation NSE (30 EC)
18 EC internship within NSE
6 EC G, D, R courses (selected from list below)
6 EC approved by the thesis advisor

G list
AP3091 Elementary Particles 6 EC
AP3051 Advanced Quantum Mechanics 6 EC
AP3011 Chaotic processes 6 EC
D list
CH3771 D-Nuclear Science 3 EC
CH3721 D-Nuclear Chemistry 6 EC
CH3781 D-Chemistry of the Nuclear Fuel Cycle 6, or 3+3 EC
AP3341 D-(Nuclear) Reactor Physics 6 EC
AP3311 D-Condensed Matter: Structure and Dynamics 6 EC
AP3351 D-Radiation Detection and Medical Imaging 6 EC
AP3371 D-Radiological Health Physics 6 EC
R list
AP3641 R Nuclear Thermal Hydraulics 3 EC
AP3631 R Kinetics and Dynamics of Nuclear Reactors 3 EC
AP3321 R (Nuclear) Reactor Physics Special Topics 3+3 EC
AP3361 R Medical Physics & Radiation Technology: Imaging 6 EC
AP3581 R Medical Physics and Radiation Technology: Radiotherapy 6 EC
AP3241 R Particle Therapy 6 EC
WB4416 Nuclear Engineering 3 EC

- **Casimir pre-PhD**

This programme focuses on preparing and educating MSc students for a PhD position within the Leiden Institute of Physics (LION) or the Kavli Institute of nanoscience (or elsewhere). It is also designed to respond to the increased mobility of students after their BSc and entering an MSc programme.

Leiden University and Delft University of Technology have established in 2004 the Casimir graduate school (<http://casimir.researchschool.nl>) which accommodates PhD students within the Kavli Institute for Nanoscience in Delft and the Leiden Institute of Physics (LION). The research within the school is grouped into 6 themes, each covering theoretical, experimental and applied research areas both at Leiden and Delft.

For Applied Physics students in Delft, admission into this programme proceeds as follows. Students within the Applied Physics degree courses inform the course Director, Dr J. M. Thijssen that they are interested in following the Casimir special programme in the course of their first semester. After the first examination period in January, a special committee consisting of staff members from both Leiden and Delft decides on definite admission into the programme. Students who are declined can continue with the AP track without incurring delays. For a limited number of students completing this special programme successfully, a PhD position is guaranteed.

Note: in order to qualify for one the PhD positions, students should complete this programme within two years. In cases where students incur substantial delays without good reason, the admission into the special programme can be withdrawn.

The Casimir special programme comprises:

- Quantum mechanics and Statistical mechanics taken in either Leiden or Delft (see the first table below)
- One of the two mathematics courses 'Complex Analysis' or 'Partial Differential Equations' in Delft (see the first table below)
- One course from the 'Foundational' list (see below)
- Two courses from the 'Topical' list (see below)
- One course from the 'Methods' List (see below)
- Ethics (3 EC) and a course from the S-list (3 EC)
- A research project of 36 EC in a department in of the Kavli Institute in Delft or the LION in Leiden.
- Two smaller projects, of 8 EC each, to be carried out in different group, and in a different group than where the 36 EC Research project takes place.
- Writing a research proposal (possibly based on the large or on the smaller research projects), 8 EC.
- The remaining EC's (at least 12) are filled with courses from the topical, foundational or methods lists.
- Participation in the Les Houches summer school (France) which is organized jointly with French Universities in Grenoble and Lyon. This course is not compulsory although it is strongly encouraged to participate. Participation is free for students admitted into the Casimir special programme.

Delft			Leiden		
AP3051G	Advanced quantum mechanics	6 EC	Quantum theory	Level 400	9 EC
AP3021G	Advanced Statistical Mechanics	6 EC	Statistical Physics	Level 400	9 EC
The two math courses:					
WI4143TN	Complex Analysis		6 EC		Delft
WI3150TU and WI4150TU	Partial Differential Equations		6 EC		Delft

'Foundational List'			
Note: these courses are not taught in each year! Consult the relevant web pages to see whether a particular course is taught			
Course Code (D) Level (L)	Course title	Location	EC
500	Effective Field Theory	Leiden	9
500	Quantum Field Theory	Leiden	6
500	Theory of Condensed Matter	Leiden	9
500	Quantum Optics and Quantum Information Theory	Leiden	9
400	Theory of General Relativity	Leiden	6
500	Topics of Theoretical Physics	Leiden	9
AP3681	Fairy Tales of Theoretical Physics	Delft	6

'Topical' list			
Note: these courses are not taught in each year! Consult the relevant web pages to see whether a particular course is taught			
Course Code (D) Level (L)	Course title	Location	EC
500	Advanced Biophysics	Leiden	9
NS3511TU	Molecular Biophysics	Delft	6
400	Introduction to Astroparticle Physics	Leiden	6
500	Experimental Classical and Quantum Optics	Leiden	6
NS3521TU	Mesoscopic Physics	Delft	6
NS3531	Molecular Electronics	Delft	6
AP3191D	Physics of Semiconductor Nanodevices	Delft	6
NS3621	Quantum Information Processing	Delft	6
500	Single Molecule Optics	Leiden	6
500	Surface Physics	Leiden	6
AP3661	Quantum Entanglement	Delft	6

'Methods' list:			
Note: these courses are not taught in each year! Consult the relevant web pages to see whether a particular course is taught			
Course Code (D) Level (L)	Course title	Location	EC
400	Computational Physics	Leiden	6
AP3081G	International Course on Computational Physics	Delft	6
NS3501	Nanotechnology	Delft	6
500	Scanning probe Microscopy	Leiden	6

3.4 Honours track

This is an individual programme of about 30 EC which contains a specially developed 6 EC course for all TU Delft honours track students plus a 24 EC coherent package of challenging courses. The full Applied Physics programme including the additional honours track should be completed within 2 years. Access to the honours track and the programme of the honours track should be submitted to the Board of Examiners after approval by the Applied Physics' programme director Dr. J.M. Thijssen.

3.5 Double degree programme Applied Physics – Management of Technology⁵

This is a three year programme Applied Physics – Management of Technology of the Faculties of Applied Sciences (AS) and Technology, Policy and Management (TPM).

Students finishing a Master AP degree with specialisation MoT may decide to do an additional year of Master MoT courses and thesis in order to obtain a double degree in both AP and MoT.

Access to this double degree programme is decided upon by the Board of Examiners after approval by Applied Physics' programme director Dr. J.M. Thijssen and MoT coordinator Dr. W.M. de Jong. The programme consists of:

Year	Programme	EC
1	The AP core programme	90
2	The MoT specialisation	30
3	30 EC of MoT courses and a 30 EC final project	60

⁵ More generally, double degree programmes combining applied physics with other master courses taught at Delft are possible, but always subject to the restrictions imposed by the universities. The main restrictions are that the double degree programme comprises at least 180 EC and that there are two identifiable final project reports for both degrees. Formal permission from the deans of the facult(y)(ies) is required.

Section 2 ADMISSIONS

Article 4 Admissions

For admissions see article 5 of the Teaching and Examination Regulations

Applicants from other institutions

Applicants from other institutions seeking admission to the MSc programme in Applied Physics must, in most cases, possess a Bachelor of Science degree in either Physics or Applied Physics, or have met the standard requirements thereof.

Students holding a Bachelor of Science degree in Applied Physics from the universities of Eindhoven and Twente are admitted.

Students holding a Bachelor of Science degree in physics from a Dutch (general) university are admitted, however, depending on the department of their choice, they may be required to do some BSc modules as part of their Master programme.

Bridging programmes

Students holding a Bachelor of Science degree in Chemical Engineering, (Applied) Mathematics, Electrical Engineering, Aeronautical Engineering or Mechanical Engineering from a Dutch (Technical) University may apply, but, if admitted, will be required to follow a bridging programme to provide them with the required background to allow them to complete the Master's programme. The bridging programme is decided upon by the Director of Education on an individual basis.

The same applies to students holding a Bachelor of Engineering degree in Physics Engineering, from a Dutch University of Professional (Technical) Education. For students from the Haagse Hogeschool holding a Bachelor degree in applied physics, the bridging programme is fixed (see below for details). 18 EC of any bridging programme can be obtained within the Master's programme.

Code	Name of Module (all modules are part of the BSc programme Technische Natuurkunde)	EC
TN2545	Systems & Signals	6
TN2344	Waves	6
TN2301 + TN2311	Inleiding Kwantum- mechanica (3 ECTS) and Kwantummechanica A deel 1 (3 ECTS)	6
TN2053	Electromagnetism 1	6
TN2951-P	Research laboratory (2 experiments from different departments)	2
BSc total BSc premaster		
WI2140	Differential Equations	4
WI1410TN + WI2242TN	Linear Algebra	6
BEng total		36
BEng premaster		18

The admission of students from foreign BSc (Applied) Physics programmes will be decided upon by the admissions officer of the Applied Physics master. University-wide requirements concerning minimum GPA (Grade Point Average) and/or GRE (Graduate Record Examination) in addition to minimum scores for either TOEFL or IELTS tests on English proficiency, apply to all applicants.

Section 3 EXAMINATIONS

Article 5 Order of the exams

5.1 Graduation Project, Master's thesis

You may enroll for your Master Thesis Project if you:

- have been admitted to the master programme Applied Physics,
- have passed needed bridging modules or other obligations from the bachelor programme,
- have passed your G list modules (18 EC) and your D list modules (12 EC),
- have made a project plan with your thesis supervisor; this project plan should be handed in at enrollment.
- The date and time of the master project presentation is determined by the thesis supervisor, after hearing the student. In exceptional cases, the programme director may be involved in setting this date and time.

5.2. Practical laboratory work

In order to be allowed to do practical laboratory work, students must have completed the course in laboratory safety or an equivalent thereof. At the start of the final project, the appropriate registration form *must* be filled in and given to the final project administration.

Article 6 Protocol for Graduation projects

6.1 The programme is concluded by fulfilling a final assignment and presenting a Master's thesis.

6.2 The Master's thesis is assessed by a thesis Board of Examiners, as laid down in art 27 of the Rules and Guidelines of the Board of Examiners

6.3 The student applying for the Master's degree audit has to defend his thesis before the thesis Board of Examiners mentioned in 6.2.

Further rules governing the MSc graduation projects can be found in article 26 to 29 of the Rules and Guidelines of the Board of Examiners

Article 7 The form of the examinations and the methods of assessment

The form of the examinations and the methods of assessment are described in the (digital) studyguide

Section 4 Flexible Study programme

Article 8 Composing a flexible study programme

8.1 A master student may compile a curriculum to which an examination is connected. The curriculum must consist entirely, or essentially, of curriculum units that are taught for the benefit of his/her own instruction and may be completed with curriculum units that are required by another curriculum and/or by other institutions of scientific education. The curriculum must comply with the final attainment levels of the institution to which the application is submitted.

8.2 The curriculum mentioned in 8.1 shall be accompanied by a motivation of choice and shall be submitted to the Board of Examiners for approval.

Section 5 Additional Rules

Article 9 Transition ruling

Since January 2010, the department of nanoscience has been split into two new departments: bionanoscience and quantum nanoscience. Thereby two new tracks have replaced the old nanoscience track. Students who have started their master before 2010 within the nanoscience track, will be awarded a diploma for either the quantum nanoscience or the bionanoscience track. D-list courses for the nanoscience track will be automatically accepted for these two new tracks.

Article 10 Degree supplement

An overview of the study modules taken is given on the certificate. The degree supplement is issued in English.

Article 11 Date of commencement

These regulations shall come into force on 30 August 2010