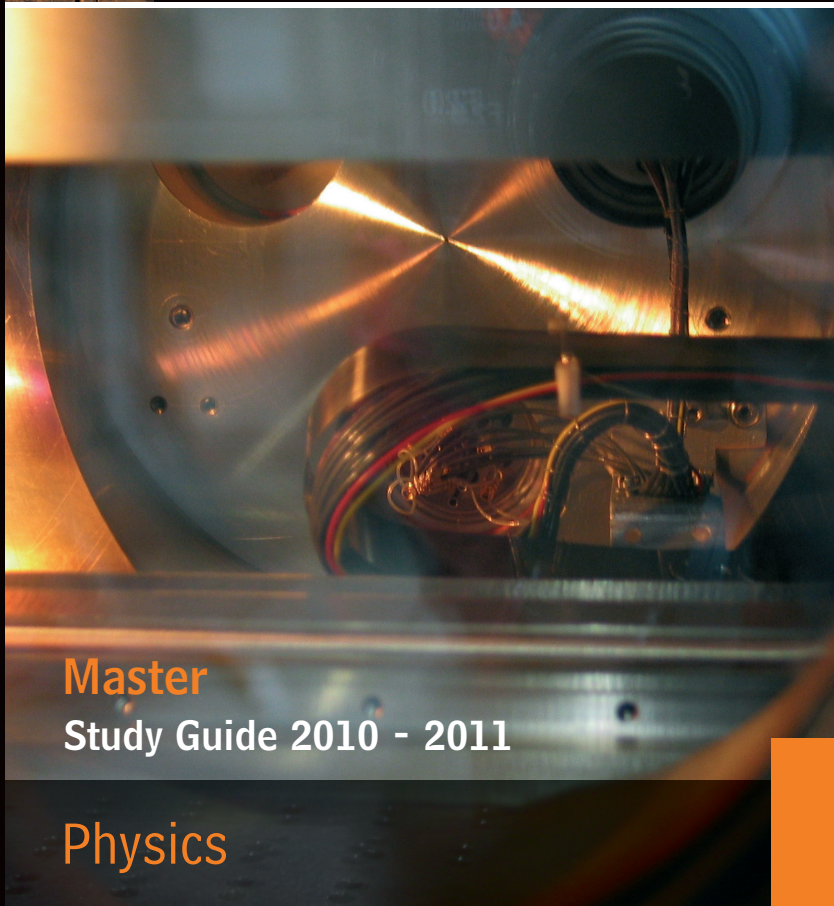




Faculty of Science



Master
Study Guide 2010 - 2011

Physics



Universiteit Leiden
The Netherlands

Leiden University. The university to discover.



physics.leidenuniv.nl/edu



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Important disclaimer!

This guide provides useful information in compact form, based on information available at July 30th 2010. After this date changes may still occur. For this reason, the text of this study guide is not binding. The latest valid information on schedules, programmes, rules and regulations can always be found on-line on the website www.physics.leidenuniv.nl/edu.

Personal information

name		
address		
postal code/place		
date of birth		
private telephone	mobile	
e-mail		
bank account		
passport nr.	expires	
driving license nr.	expires	
public service number (BSN)		
family doctor		
medication		
forbidden medication		
blood group	rh-factor	donor: yes/no

IN SPECIAL CASES PLEASE CONTACT

name		
address		
postal code/place		
private telephone	mobile	

In case of loss the owner of this agenda requests the finder to contact him/her.

Introduction

Dear Master student,

It gives me pleasure to welcome you to the Leiden Institute of Physics (LION). This study guide describes the programme and the organisation of your Master of Science in Physics, which is part of the Graduate School of Science at Leiden University.

All master programmes are built upon the high-level research within the Institute of Physics. Some programmes are pure research tracks, while others offer you the possibility to broaden your knowledge by including elements of science-based business, science communication or education.

If you have any questions this guide (or websites referred to) does not answer, do not hesitate to ask one of the people whose names you will find in here. We aim at optimizing the circumstances at LION, for you to get as much as possible out of your studies.

I wish you success and hope that your master study will be a source of inspiration!

Prof.dr. Jan Aarts
Director of Education.

The people of the MSc in Physics programme

Huygens Laboratory, Instituut-Lorentz, J.H. Oort Building and
Kamerlingh Onnes Laboratory
Niels Bohrweg 2, Leiden, Postbus 9504, 2300 RA Leiden

Director of Education

Prof. dr Jan Aarts
Oort Building, room 159
Phone: (+31)- (0)71-527 5478
aarts@molphys.leidenuniv.nl

Study advisor

Dr. Reyer Jochemsen
Huygens Laboratory, room 304
Phone: (+31)- (0)71-527 5764
Present: Tue and Thur afternoon
studieadviseur@physics.leidenuniv.nl

Physics programme coordinator

Drs. Jan Vink
Huygens Laboratory, room 303
Phone: (+31)- (0)71-527 1278
Present: Mon, Tue, Wed and Thu
onderwijscoordinator@physics.leidenuniv.nl

Coordinator Research in Physics (Theoretical and Cosmology)

Dr. Peter Denteneer
Oort Building, room 235
Phone (+31)- (0)71-527 5508
pident@lorentz.leidenuniv.nl

Coordinator Physics and SCS

Prof. dr. Jos van den Broek
Huygens Laboratory, room 129
Phone: (+31)- (0)71-527 5672
broek@edufwn.leidenuniv.nl

Chairman Board of Examiners

Prof. dr. Gerard Nienhuis
Huygens Laboratory room 904
Phone: (+31)- (0)71-5275822
nienhuis@molphys.leidenuniv.nl

Chairman Department Teaching Committee

Dr. Martin van Exter
Huygens Laboratory room 904
Phone: (+31)- (0)71-5275927
vanexter@molphys.leidenuniv.nl

Coordinator Research in Physics (Experimental and 'Casimir')

Dr. Reyer Jochemsen
Huygens Laboratory, room 304
Phone: (+31)- (0)71-527 5764
studieadviseur@physics.leidenuniv.nl

Coordinator Physics and Science Based Business

Dr. Harmen Jousma
Snellius, room 131
Phone: (+31)- (0)71-5274424
jousma@sbb.leidenuniv.nl

Coordinator Physics and Education

Dr. Hans v. Bemmél
ICLON
Phone: (+31)- (0)71-527 6491
h.j.m.van.bemmel@iclon.leidenuniv.nl

Programme of the MSc in Physics

Description of the programme

The programme of the Master of Science (MSc) in Physics at Leiden University is characterised by its emphasis on internships. At least 50 % of the time (and study points) is spent on research training. The students form part of the research groups of the Leiden Institute of Physics (LION). The study time may also include a stay in a research group outside Leiden University.

Leiden University offers an MSc programme in physics with four specialisations. One is a research specialisation with various pre-defined streams. The other three combine the main elements of the research specialisation with topics in Science-Based Business (SBB), Communication, or Education. The streams in the research specialisation are Experimental Physics, Theoretical Physics, Cosmology (in collaboration with the Department of Astronomy), and 'Casimir prePhD'. The latter is run within the framework of the Casimir Research School, a joint undertaking between Leiden University and Delft University of Technology.

Students can start the MSc programme in Physics at any moment during the year. The duration of the programme is two years (120 EC). Students who complete the programme receive the degree Master of Science in Physics, with specification of the specialization and stream. Details are provided below. All specialisations have the same Director and the same Board of Examiners.

A Board of Admissions will advise on admissions. Candidates with a BSc degree or equivalent can apply for admission. The admission guidelines are given in the track descriptions below for each specialization. The admission process may include an interview with the Board of Admissions. Foreign applicants must also provide proof of proficiency in English (IELTS level ≥ 6.5). Admission is possible throughout the year, but we advise foreign students to start in September or February. Further information is available on the website www.physics.leidenuniv.nl/edu/master.

The goal of each programme is to train the student as an independent researcher, and to develop the necessary skills and proficiency to advance his/her career. In all specialisations therefore, it is possible for the elective part of the programme to choose courses offered by other universities or graduate schools. The programme should have sufficient level and cohesion, and the elective part in all cases requires written approval of the Board of Examiners *in advance*.

Schematic representation of the MSc programme

Tracks	Master of Physics (2 years)		
Research in Physics	40 - 50% Physics Courses		60 - 50% Research projects
Physics and Communication / Education / Science Based Business	17% Physics Courses	33% Research project Physics	50 - 40% Courses and internship Communication / Education/ Science Based Business

The master programme is characterized by a strong connection with ongoing research. In the Research in Physics specialisation, the student can either emphasize research training, with up to 60% of the time spent on projects, or do more coursework (up to 50 %) and less work on research projects (minimum of 50 %).

The strength of our master programme is its tailor-made character. For each student a programme will be designed. Further information can be obtained from the study advisor.

The schedule of the courses in 2010-2011 can be found on page 34. The most recent schedule can also be found on the website www.physics.leidenuniv.nl/edu, under master<schedules.

Description of the programme specialisations

In this part of the guide you will find detailed information on the various specialisations. After a short description, the qualifications for admission and the programme structure of each specialisation are defined. The contents of this chapter are based on the *Course and examination regulations (Onderwijs en Examenregeling, OER)* of the MSc in Physics of Leiden University. The original text of the 'OER' can also be found on the internet; http://science.leidenuniv.nl/index.php/faculteit/onderwijs/oer_master_opleidingen

Before starting the MSc in Physics, students are required to make a study plan, containing a list of courses and research projects they intend to undertake. The plan has to be discussed with the specialisation coordinator and/or the study advisor. A special 'study plan' - form should be filled out and sent to the study advisor by e-mail. This form can be found on the website www.physics.leidenuniv.nl/edu, under master<forms.

Each of the specialisations has the same Director and the same Board of Examiners. Changes within the predefined specialisations are possible after approval by the Board of Examiners. Some master courses are taught each year, others once every two years. The schedule for the master courses can be found at the end of this guide. Up-to-date information on the content of the courses can be found at www.physics.leidenuniv.nl/edu, under master<course descriptions.

You may always contact the coordinators of the specialisations for more information. You are also more than welcome to contact the study advisor. In the chapter *The people of the MSc of Physics programme* you can find contact information (page 7).

Specialisation Research in Physics

The various streams in this specialisation distinguish themselves by a setup and core of the curriculum which emphasizes the intended perspective and goal of that stream. In all cases, the programme consists of two components, a set of courses and one or more research projects. All streams offer research training which allows the pursuance of a PhD degree as a next step, although other career options are still fully open. The 'Casimir pre-PhD' stream puts emphasis on preparing for PhD research within the Casimir Research School, and requires a strong academic record for admission.

Experimental Physics stream

Description

The Experimental Physics stream concentrates on the subjects of the different research groups in the Leiden Institute of Physics (LION). They comprise Biological and Molecular Physics; Quantum Optics and Quantum Information; and Condensed Matter Physics.

Research in the field of Biological and Molecular Physics connects the domain of molecular physics with that of the life sciences, encompassing techniques such as single-molecule spectroscopy and imaging, nano-optics, and electron paramagnetic resonance. Advanced methods are developed to study the photophysics of single molecules and nano-particles in great detail. The same methods are applied to address fundamental questions in the biosciences from a quantitative, physical point of view, by the observation and manipulation of biomolecules in living cells. Functionally important, structural features of biomolecules are investigated by spectroscopic methods ranging from the optical to the microwave domain.

Research in Quantum Optics and Quantum Information explores the quantum-mechanical properties of light and its interaction with matter, with quantum entanglement as the core concept. The

research focuses on opto-mechanical entanglement, spin-photon entanglement, topologically structured light fields and optics in nano-structured materials. For this purpose the group operates an extensive range of table-top experiments, both at room and cryogenic temperatures, most of which can be set up relative easily from a large repertoire of optical components. The emphasis is on experiments, but the research aims at a full theoretical understanding of the experimental results.

Research in Condensed Matter Physics concerns the study of the fundamental properties of solids, on length scales varying from macroscopic down to nanometers. It aims at acquiring understanding by investigating model systems and novel materials, with emphasis on the collective behaviour of dense interacting systems. This can be either from a statistical point of view, as in granular matter, polymers, or atomic motion and reactions at surfaces; or from an electronic and quantum point of view, as in molecular conductance, superconductivity, and magnetism. Among the experimental techniques used are (magneto)transport experiments and scanning probes (STM and AFM), down to (sub-) Kelvin temperatures.

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics or Astronomy, will be admitted to the programme. For all other (international) candidates, the Board of Admissions will judge the equivalence of their previous training to these BSc degrees. The choice in optional courses in the MSc programme may be limited by the need to adapt the programme to the present knowledge of the candidate.

Programme

The programme consists of courses and research projects totalling (minimally) 120 EC (equivalent to two years of study). It can to a high degree be tailored to individual needs and interests.

Components	level	EC
courses from the Theoretical Physics courses on offer*)	400-500	18
Optional master courses in Physics	400-500	42-30
Physics research project 1 in a LION research group (with Master thesis and oral presentation) **)	600	36
Physics research project 2 in a research group within or outside LION (with Master thesis and oral presentation)**)	600	24-36

*) For a number of research subjects, the course Quantum Theory is strongly advised.

**) A research project of 36 EC consists of 30 EC experimental work, a Master thesis of 5 EC, and an oral presentation of 1 EC. Smaller projects consist of the same components, proportionally scaled.

Master courses in Physics (experimental)	Level	EC
Biophysics	400	6
Advanced Biophysics	500	6
Biomolecular Motors	500	6
Computational Physics	400	9
Experimental Classical and Quantum Optics	500	6
Introduction to AstroParticle Physics	400	6
Physics of Scientific Space Instruments	400	4
Scanning Probe Microscopy	500	6
Single Molecule Optics	500	6
Surface Physics	500	6

Note that not every course is given each academic year and that also the offer of courses may change. The course 'Biophysics' is given in Delft.

This year's schedule can be found on page **Error! Bookmark not defined.**

Course descriptions can be found on the website, www.physics.leidenuniv.nl/edu, under master<course descriptions.

Theoretical Physics stream

Description

The Theoretical Physics stream prepares the student for scientific research towards the PhD in a broad range of topics, such as High Energy Physics and Particle Cosmology; Theoretical Physics of Life Processes; and Condensed Matter Theory. The master will also be well-equipped for industrial research or other problem-solving tasks that demand strong analytical and computational skills.

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics or Astronomy, will be admitted to the programme. For the specialization in Theoretical Physics, in-depth knowledge is required of undergraduate courses with theoretical and mathematical emphasis: quantum physics, electrodynamics, statistical physics, and complex analysis. For all other (international) candidates, the Board of Admissions will judge the equivalence of their previous training to these BSc degrees. The choice in optional courses in the MSc programme may be limited by the need to adapt the programme to the present knowledge of the candidate.

Programme

<i>Components</i>	<i>Level</i>	<i>EC</i>
Quantum Theory	400	9
Topics in Theoretical Physics	500	9
2 courses from the Theoretical Physics courses on offer	400-500	18
Optional master courses from Theoretical Physics, Mathematics or Physics. A maximum of one master course can be taken anywhere at Leiden University.	400-600	24
Physics research project in Theoretical Physics	600	45
Master Thesis (10 EC), oral presentation (5 EC)	600	15

Master courses in Theoretical Physics	Level	EC
Black Holes and Gravitational Waves	500	3
Effective Field Theory	500	3
Quantum Field Theory	500	6
Quantum Optics and Quantum Information	500	9
Quantum Theory	400	9
Statistical Physics	400	9
Theoretical Cosmology	500	3
Theory of Condensed Matter	500	9
Theory of General Relativity	500	6
Topics in Theoretical Physics*)	500	9

*) The content of the course Topics in Theoretical Physics varies from year to year, the course has an interactive format in the sense that weekly meetings consist of presentations by the participating students.

For the optional Master courses, a choice can also be made from the courses in the Physics, Cosmology, or 'Casimir pre-PhD' streams; or from courses in the M.Sc. program Mathematics. Note that not every course is given each academic year and that also the offer of courses may change.

This year's schedule can be found on page **Error! Bookmark not defined.**

Course descriptions can be found on the website, www.physics.leidenuniv.nl/edu, under master<course descriptions.

Cosmology stream

Description

The Cosmology stream is positioned at the interface between Theoretical Physics and Observational Astronomy. The core elements of the specialization are theory, data handling, and numerical simulations. It prepares the student for scientific research towards the PhD in a range of topics, but the master will also be well-equipped for industrial research or other problem-solving tasks that demand strong analytical and computational skills.

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics or Astronomy, will be admitted to the programme. Similar to the Theoretical Physics stream, in-depth knowledge is required of undergraduate courses with theoretical and mathematical emphasis: quantum physics, electrodynamics, statistical physics, and complex analysis. Also prerequisite is the Leiden Bachelor course on Physics of Elementary Particles, or a clear equivalent. The Bachelor course Relativistic Electrodynamics is strongly advised.

For all other (international) candidates, the Board of Admissions will judge the equivalence of their previous training to these BSc degrees. The choice in elective courses in the MSc programme may be limited by the need to adapt the programme to the present knowledge of the candidate.

Programme

<i>Components</i>	Level	EC
Theory of General Relativity	400	6
Origin, Structure and Evolution of the Universe	400	6
Quantum Theory	400	9
Effective Field Theory	500	3

Particle Physics and the Early Universe	500	6
Observational Cosmology	400	3
Choice of Black Holes and Gravitational Waves / Theoretical Cosmology	500	3
Choice of Computational Astrophysics / Data Mining	500	3
Optional master courses ¹	400-500	21
Research project in Cosmology 1 (with Master thesis and oral presentation) ²	500	24
Research project in Cosmology 2 (with Master thesis and oral presentation) ²	500	36

Note: the two research projects together have to cover the three components mentioned above, namely theory, data handling and numerical simulations.³

<i>Master courses for Cosmology</i>	Level	EC
Galaxies: Structures, dynamics, evolution	400	6
Gravitational Lensing	400	3
Introduction to Astroparticle Physics	400	6
Numerical Simulations in Astrophysics	400	1-3 ⁴
Physics of Gamma Ray Bursts	400	3
Physics of Scientific Space Instruments	400	4
Quantum Field Theory	500	6
Star formation	400	3
Topics in Theoretical Physics	500	9

¹ A maximum of one master course can be taken anywhere at Leiden University.

² A research project of 36 EC consists of 30 EC experimental work, a Master thesis of 5 EC, and an oral presentation of 1 EC. Smaller projects consist of the same components, proportionally scaled.

³ Dispensation can be granted by the Exam Committee if a student can demonstrate competence in a component acquired outside the M.Sc. programme.

⁴ Numerical simulations in Astrophysics can be done as modules of 1 EC each up to a total of 3.

For the optional Master courses, a choice can also be made from the courses in the Physics, Theoretical Physics, or 'Casimir pre-PhD' streams; or from courses in the M.Sc. program Mathematics. Note that not each of the Master Courses in Cosmology is given each academic year and that also the offer of courses may change.

'Casimir pre-PhD' stream

Description

The 'Casimir pre-PhD' stream is offered under the auspices of the Casimir Research School, a joint undertaking of the Leiden Institute of Physics (LION), and various departments at Delft University of Technology. It prepares the student for scientific research in a Ph.D. position within the Casimir Research School, or elsewhere, and therefore puts strong emphasis on working in a research environment, in particular within the themes of the Research School. These are *Molecular Biophysics*, *Physics of nanostructures*, *Quantum Matter and Functional Materials*, *Quantum Information and quantum optics*, *Universe physics; theory and instrumentation*, and *Dynamic Complex Systems*.

The programme follows a strict schedule, in which the first year is devoted to laying a theoretical basis, and the second year to research and study projects, including the writing of a research proposal. The study projects are a special characteristic of the programme, specifically aiming at broadening the research perspective of the student. Conditions exist for admission into the stream, as well as for admission into the second year.

Qualifications for admission

All admission is through selection by an admission committee. Students from any university in the Netherlands with a BSc degree in Physics or Astronomy can apply directly for admission. Their academic record needs to show good grades for undergraduate courses, in particular for quantum physics, electrodynamics, statistical physics, and complex

analysis. Moreover, the time needed to obtain the BSc degree should, apart from extraordinary circumstances, not have exceeded four years.

For all other (international) candidates, separate admission to the Physics Master needs to be obtained through the University Board of Admissions. The University Board judges the equivalence of previous training to Dutch BSc degrees. The application to the 'Casimir pré-PhD' stream can be made in parallel, but a positive outcome is subject to admission by the University Board.

In the second year of the programme, students will be given the opportunity to attend a Summer School at the start of the year. Admission to the second year is on the condition that the courses of the first year (60 EC) have been successfully completed. Students who are not admitted to the second year can continue in one of the other streams of the Physics Master.

Programme

<i>Components</i>	Level	EC
Quantum Theory	400	9
Statistical Physics	400	9
1 course from the list 'Foundational'	400-500	6
2 courses from the list 'Topical'	400-500	12
1 course from the list 'Methods'	400-500	6
Optional Master courses in Physics	400-500	18
Research project in Physics (with Master thesis and oral presentation)	500	36
Study projects and Writing Research Proposal	500	24

Research project and study projects are also guided by a strict timeline. The Research project starts in September and finishes in February. The two study projects (8 EC each) are to be carried out in different groups, and in a different group than where the Research project took place, and have to be carried out between March and the end of May. Writing a research proposal is the last item in the programme. For a limited

number of students within this track, a PhD position will be guaranteed.
 Details can be found at the website of the Casimir Research School.

<u>Foundational courses</u>	Level	EC
Effective Field Theory	500	3(L)
Quantum Field Theory	500	6(L)
Quantum Optics and Quantum Information	500	9(L)
Theory of Condensed Matter	500	9(L)
Theory of General Relativity	400	6(L)
Topics of Theoretical Physics	500	9(L)
<u>Topical Courses</u>	Level	EC
Advanced Biophysics	500	6(L)
Biophysics	400	6(D)
Introduction to Astroparticle Physics	400	6(L)
Experimental Classical and Quantum Optics	500	6(L)
Mesoscopic physics	400	6(D)
Molecular Electronics	500	6(D)
Physics of semiconductor devices	400	6(D)
Quantum Information Processing	500	6(D)
Single Molecule Optics	500	6(L)
Surface Physics	500	6(L)
<u>Methods</u>	Level	EC
Computational Physics	400	6(L or D)
Nanotechnology	400	6(D)
Physics of Scientific Space Instruments	400	4(L)
Scanning Probe Microscopy	500	6(L)

Courses given in Leiden are denoted (L), courses given in Delft are denoted (D). Electives can be chosen from the full list, irrespective of the location. Note that not each of the Master Courses is given each academic year and that also the offer of courses may change.

Specialisation Physics and Science Based Business

Description

The MSc programme Physics and Science Based Business (SBB) prepares students for a career in science-related business and administration and for innovation and enterprise from a physics perspective. In addition to knowledge of physics, students obtain competence with respect to organisations, people in organisations and establishment and management of processes. Students with a MSc in Physics and Science Based Business are also admissible to a PhD programme.

In order to get a SBB Master annotation a minimal programme consisting of the course SBB Fundamentals and the SBB internship period must be completed (see below). The course SBB Fundamentals can in principle be taken in the “free choice” part of the research tracks of the MSc in Physics subject to approval of the Board of Examiners.

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics will be admitted to the programme.

For all other (international) candidates, the Board of Admissions will judge the equivalence to this BSc degree of their previous training. Notably, applicants with a major in Physics and a minor in a related field, such as Astronomy, Chemistry or Mathematics will be considered.

Programme	level	EC
Physics		(60-80)
Physics research project 1	600	30
Master Thesis (5 EC) and oral presentation (1 EC)	600	6
Courses to be selected in correspondence with the research topic		24
Optional:		
Extension of the Physics research component		0-23
Science Based Business		(60-37)
SBB Fundamentals	400	15
SBB Internship	500	22-35
Optional:		
Orientation on Technopreneurship:		
Entrepreneurial Managment	400	5
Orientation on Technopreneurship:		
Business Planning	400	5
SBB electives		0-13

See for more information on Science Based Business the following website: www.sbb.leidenuniv.nl.

Specialisation Physics and Science Communication & Society

Description

The Communication part of the master specialisation Physics and Science Communication & Society is offered by lecturers in the department of Science Communication & Society (SCS).

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics will be admitted to the programme.

For all other (international) candidates, the Board of Admissions will judge the equivalence to this BSc degree of their previous training. Notably, applicants with a major in Physics and a minor in a related field, such as Astronomy, Chemistry or Mathematics will be considered.

Fluency in Dutch is required; the MSc-course Science Communication & Society fundamentals will be given in Dutch.

Programme

The first year of the MSc-programme (60 EC) focuses on Physics. Specialization in communication (minimum of 40 EC, up to 60 EC) will be realized in the second year.

	level	EC
Physics		(60-80)
Physics research project 1	400-500	30
Master Thesis (5 EC) and oral presentation (1EC)	500-600	6
Courses to be selected in correspondence with the research topic		24
Optional:		
Extension of the Physics research component or extra Physics master courses		0-20
Science, Communication and Society		(60-40)
Fundamentals of Science Communication & Society	400/500	17
Training period	500/600	23-34

Optional:

Masterthesis	500/600	5
Communication research connected to the internship, in preparation of the masterthesis	500/600	4
Electives in communication	≥ 400	0-8

See for more information on Science Communication and Society the following website: www.scs.leidenuniv.nl

An internship can be done in the following areas of expertise:

- Journalism, e.g. at a:
 - Popular-scientific magazine
 - Scientific editorial board of a newspaper
 - At a scientific programme on radio or TV (Including website content management)
- Museology, e.g. at a:
 - Science-museum
 - Scientific centre
 - Zoo (Educational programme, Exhibitions, Websites)
- Communication and Education, e.g. at a:
 - Nature conservation organisation
 - Agency for science-communication and education (Educational programme's Materials for educational purposes)

SCS closely cooperates with the MSc-specialisation 'Journalistiek & Nieuwe Media' (MSc Dutch Language and Culture, Faculty of Humanities, Leiden University). Courses in scientific communication can be taken at other universities (e.g. TU Delft, Wageningen UR or Vrije Universiteit). The minimal level of the electives is 400.

Before participating in the MSc-track 'Science & Communication' the complete programme, including electives, should be presented for approval to the SCS-coordinator (prof. dr. Jos van den Broek) and the study advisor.

Specialisation Physics and Education

Description

The MSc programme Physics and Education prepares students for a career in teaching Physics. The programme includes a 60-EC Physics research programme. Students with an MSc in Physics and Education are also admissible to a PhD programme.

In their specialisation student teachers develop their competences to innovate their practice (e.g., by developing and testing instruction on a specific topic). This programme meets the requirements to obtain the degree "eerstegraads lesbevoegdheid" in Physics, needed for teaching at Dutch secondary schools.

Qualifications for admission

Students from any university in the Netherlands with a BSc degree in Physics will be admitted to the programme.

For all other (international) candidates, the Board of Admissions will judge the equivalence of their previous training to this BSc degree. Notably, applicants with a major in Physics will be considered. It is strongly recommended that the BSc programme has included the 10 EC course Learning, Presentation and Communication offered by the Leiden School of Education (ICLON) or an equivalent course. Applicants must provide proof of proficiency in Dutch.

Programme	level	EC
Physics		(60)
Physics research project 1	600	30
Master Thesis (5 EC) and oral presentation (1 EC)	600	6
Courses to be selected in correspondence with the research topic		24
Education *)		(60)
Educational Theory	300	5
Supervision of Professional Development	400	7
Teaching methodology	500	10
Specialisation **)	600	8
Teaching Practice		30

- *) The Education part is offered as a joint programme of the Faculty of Science and the Leiden School of Education (ICLON).
- **) In their specialisation, student teachers develop their competences to innovate their practice (e.g., by developing and testing instruction on a specific topic). This programme is adequate to obtain the so-called "eerstegraads lesbevoegdheid" in physics needed for teaching at Dutch high schools.

Research projects

Depending on the specialisation, every student can do one or two Physics research projects. A research project can be done at one of the groups of the Leiden Institute of Physics (LION). Students that have obtained their Bachelor degree in Physics at Leiden University have been introduced to the research groups during the orientation on their Bachelor research. Students who want more information on the possible research projects, can contact the specialisation coordinators or the study advisor and explore the LION website: www.physics.leidenuniv.nl.

At least one of the two projects in an experimental group has to be 36 EC, divided into 30 EC for the research work, 5 EC for the thesis and 1 EC for the oral presentation. The other experimental project can vary between 24 and 36 EC, consisting of the same components, proportionally scaled. A project in Theoretical Physics has a size of 45 EC, the thesis 10 EC and the oral presentation 5 EC.

Before a research project starts, it has to be registered through a research project form. The form can be downloaded on the website, www.physics.leidenuniv.nl/edu, under master<forms. After completion the supervisor and the student must sign the form before handing it over to the programme coordinator, Huygens Laboratory, room 303. The programme coordinator will present the plan to the study advisor, who has to sign the form for approval before the student can start the project. Students who want their electronic keycard to be updated during the project (providing 24-hr entrance to the building) have to give their keycard number on the form.

During the research project, students will be provided with a workplace within the research group. Attending the (weekly) group meetings is an important component of the research project.

Students that have found an interesting research project outside Leiden University can discuss this with the study advisor. They

have to find a staff member from inside the Physics department to act as a local supervisor and ask the Board of Examiners for permission (through the study plan).

The Master thesis and presentation

Every research project has to be completed with a thesis and an oral presentation. Both the thesis and the presentation have to be evaluated by your supervisor and another LION staff member not directly connected to the research group (second assessor). Your supervisor is responsible for arranging a second assessor.

The oral presentation has to be public. Alongside with the research group members, also students and other LION members can attend. The second assessor has to be present at the presentation. The presentation has to be announced through the website. Students must send a timely e-mail with their name, the title of the presentation, the date and time and the location to onderwijscoordinator@physics.leidenuniv.nl. The organisation of the time and location of the oral presentation is the responsibility of your supervisor.

The format of the thesis should be discussed with your supervisor. It is important to have contact with your supervisor on a regular basis during the writing phase of your thesis. To make sure you can finish your research project in time, you have to make a good planning together with your supervisor. Set dates for the presentation, handing over the thesis to your supervisor and receiving your evaluation. Take into account the availability of your supervisor and second assessor in the period that you are finishing your research project.

A 1-page overview must be part of the thesis. The required format can be found on the website, <http://www.physics.leidenuniv.nl/edu/master/>

After evaluation, both a printed copy and an electronic file of the thesis should be sent to the Programme coordinator, at: onderwijscoordinator@physics.leidenuniv.nl and at Huygens Laboratory, room 303, in order to store it in the LION archives. A copy of the front page of the thesis should be handed over to the Graduate School Office (*Educatief Centrum*) when you apply for your final examination.

Studying abroad during your Leiden MSc Programme

Students who are enrolled in one of the Leiden University MSc-programmes can choose to spend some time abroad. It is the policy of the University to stimulate this, in order to broaden the students' horizon and improve their academic and language skills. Especially students who are enrolled in a 2-year (research) master programme are advised to spend some time abroad.

Leiden has many bilateral exchange and cooperation agreements with universities all over the world, including many who belong to the top. First of all, Leiden University participates in the European Union's Erasmus programme. This programme offers many possibilities to follow courses or to do a research training project at one of the universities in the European Union. Beside this, there are many exchange agreements with universities outside of Europe such as the United States, Canada, Australia, Japan, South Africa and Korea. Students can also ask their academic staff members to recommend an international institute. A list of all partner universities can be found at www.leiden.edu/internationalisation or at the website (in Dutch): www.buitenland.leidenuniv.nl.

Conditions:

Students who want to spend some time abroad have to meet certain conditions first: your Board of Examiners has to approve the study program you intend to follow. Furthermore, you must have the right academic qualifications and language skills for the intended programme. You can study abroad one semester or a full academic year. Students of the Faculty of Science should always contact Ms. Gloria Schildwacht for information, registration, selection, introduction to host university, safety regulations, scholarships, etc.

Scholarships and tuition fee:

There are several scholarships for outgoing students, such as the Erasmus scholarship if you stay in Europe and the Lustra scholarship if you go outside of Europe. Students enrolled in a 2-year (research) master programme can apply for the Outbound Study Grant. Selected students who go abroad to an exchange partner institute don't have to pay tuition fee to the guest university, because they are already enrolled at Leiden University.

Contact and Information:

Ms. Gloria Schildwacht,
International Office of the Faculty of Science
Huygens Lab, Niels Bohrweg 2, room 127
2333 CA Leiden, Phone: 071-527 57 83
Email: schildwacht@edufwn.leidenuniv.nl

Ms. Truus Rietdijk
Central International Office,
Opening hours: Monday and Thursday 13-17 am,
Plexus, Kaiserstraat 25, Leiden, Phone: 071-527 3049
Email: T.Rietdijk@io.leidenuniv.nl

See also:

www.buitenland.leidenuniv.nl (in Dutch).

Master course in Physics	Lecturer in 2009-2010	Level	EC	Scheduled	Frequency
Advanced Biophysics	Dogterom	500	6	spring 2011	each year
Advanced Quantum Field Theory		600	9		on demand *)
Biophysics	Keymer	400	6	fall 2010	each year, Delft
Black Holes and Gravitational Waves	Achúcarro	500	3	spring 2011	each year
Computational Physics	Barkema	400	9	spring 2012	every two years
Effective Field Theory	Schalm	500	3	spring 2011	each year
Experimental Classical and Quantum Optics	v. Exter	500	6	spring 2012	every two years
Introduction to Astro-Particle Physics	De Jong	400	6	fall 2010	each year
Nanotechnology	vd Drift / Alkemade	400	6	fall 2010	each year, Delft
Particle Physics and the Early Universe	Boyarski	500	6	spring 2011	each year
Physics of Scientific Space Instruments	Beijersbergen	400	4	fall 2011	every two years
Quantum Field Theory	Schalm	500	6	spring 2011	each year
Quantum Optics and Quantum Information	Nienhuis	500	9	spring 2011	every two years
Quantum Theory	Denteneer	400	9	fall 2010	each year
Scanning Probe Microscopy	Frenken	500	6	spring 2011	every two years
Single Molecule Optics	Orrit	500	6	spring 2011	every two years
Statistical Physics	Schiessel	400	9	fall 2010	each year
Surface Physics	Frenken	500	6	spring 2012	every two years
Theory of Condensed Matter	Zaanan	500	9	spring 2010	each year
Theory of General Relativity	Achúcarro	500	6	fall 2011	each year
Topics in Theoretical Physics	Vitelli	500	9	fall 2010	each year different subject 2011 : Fluid Dynamics

*) for information: onderwijscoordinator@physics.leidenuniv.nl.

This year's schedule can be found on page **Error! Bookmark not defined.** Information on the contents of the courses can be found on the internet, www.physics.leidenuniv.nl/edu under Master < course description. Note: the course 'Biophysics' is given in Delft.

Courses at other universities

In making a study plan, courses from other universities can be considered (see page 9). These can also be courses for Ph.D. students from the educational program of Research Schools or other collaborative efforts in which LION participates, provided that the training level of the MSc students allows this. One can think of courses from:

- the Delta Institute for Theoretical Physics (DITP)
(temporarily: <http://staff.science.uva.nl/~jcaux/DITP.html>)
- the Casimir Research School
(<http://casimir.researchschool.nl>).
- the Holland Research School of Molecular Chemistry (HRSMC)
(www.hrsmc.nl/education.html).

Organisation

Organisation of the MSc in Physics

The Director of Education (OD), Prof.dr Jan Aarts, is responsible for the study programme and the quality of the teaching.

For organisational questions, you can contact the programme coordinator. All information about schedules, examinations, courses, regulations, etc. is made public on the website of Physics education: www.physics.leidenuniv.nl/edu

For all matters related to study counselling and study advice, you can turn to the study advisor.

The administrative handling of the final examination takes place at the Graduate School Office of the Faculty (*Educatief Centrum*).

Students are advised, in their own interest, to see to it that the University always has the correct (study) address and telephone number. Students are able, via their ULCN-account, to change their address themselves. Students are expected to regularly check their electronic mail at the e-mail address provided by the university, their so-called *umail*-address. The faculty uses only this e-mail (*umail*) address for all electronic correspondence with students. It is advisable to empty the personal electronic mailbox regularly, to avoid important messages not arriving due to a full mailbox. Another possibility is to install an e-mail forward to another mail address you use more frequently.

Admission and registration

Candidates with a BSc degree or equivalent can apply for admission.

The admission guidelines for each track are given in the concurrent paragraphs of the chapter *Programme of the MSc of Physics*.

The admission process may include an interview with the Board of Admissions. Foreign applicants must provide proof of proficiency in English (IELTS level ≥ 6.5) and / or Dutch (depending on the chosen track). Admission is possible throughout the year but we advise foreign students to start in January or September when new classes begin. Further information is available on the website: www.science.leidenuniv.nl/graduateschool.

Board of Admissions

The members of the Board of Admissions are:

- Prof. dr G. Nienhuis (chairman)
- Prof. dr T.J. Aartsma
- Dr P.J.H. Denteneer
- Prof. dr E.J.J. Groenen
- Dr R. Jochemsen

Board of Examiners

The members of the Board of Examiners are:

- Prof.dr. G. Nienhuis (chairman)
- Dr. P.J.H. Denteneer (secretary)
- Prof.dr. E.J.J. Groenen
- Prof.dr. Th. Schmidt
- Prof.dr. J. Aarts

The tasks of the Board of Examiners are:

- the responsibility over the final examinations,
- the responsibility over the organisation of the examinations,
- the approval of the study programmes proposed by the students (after consulting the study advisor).

Department Teaching Committee

The Department Teaching Committee (*Opleidingscommissie; OC*) of the study in Physics is the advisory body that advises the Director of Education, Prof. dr. Jan Aarts. Half of the Department Teaching Committee's members are students, chosen every fall, by and from the Physics students body. In the Department Teaching Committee, all the subjects that are related to the educational programme are dealt with, among which modernisation of the study programme and evaluation of the quality of the educational programme. If you would like to participate in the discussion on education you can become a candidate for election to the Department Teaching Committee in Physics. For more information contact the chairman of the Department Teaching Committee, dr. Martin van Exter.

Study advisor

The study advisor of the Physics programme deals with all matters concerning students. He gives advice to (potential) students on the educational possibilities within and outside the study programme and provides help with planning an individual study programme. If students run into problems during their studies or if they are delayed, the study advisor can help with catching up, where necessary in consultation with others, like one of the student counsellors of the university. Should difficulties arise, it is best to contact the study advisor as quickly as possible. He will himself take the initiative if he feels there is reason to. Discussions with the study advisor are confidential (in agreement with the behavioural code of the national association of study advisors (LVSA)). Appointments can be made through the programme coordinator (onderwijscoordinator@physics.leidenuniv.nl) or the study advisor (Studieadviseur@physics.leidenuniv.nl).

De Leidsche Flesch

The student association De Leidsche Flesch ('The Leiden Jar') is especially meant for students of Mathematics, Computer Science, Physics, and Astronomy.

De Leidsche Flesch organises (among other things) a weekend for the first year students, a collective purchase of books, excursions, trips abroad, lectures, film evenings, sport days, symposia, all sorts of (drinking) get-togethers, and other fun activities. It also provides old exam papers via Internet. More information and photos can be found at De Leidsche Flesch website: www.deleidscheflesch.nl.



Organisation of the Leiden Institute of Physics

The Leiden Institute of Physics (LION) ("*Leids Instituut voor Onderzoek in de Natuurkunde*") consists of the *Kamerlingh Onnes Laboratory*, the *Institute-Lorentz* and the *Huygens Laboratory*. The Institute is located next to the other Science institutes of the University in the Bio-Science Park, a situation that favours interdisciplinary research projects.

Its main responsibility is the education and training of graduate students and postdoctoral fellows in research in Physics. In addition, it is responsible for the teaching of Physics on the BSc and MSc level at the Faculty of Science of Leiden University. The research groups of the institute participate in three research schools:

- The *Delta Institute for Theoretical Physics (DITP)*; a cooperation between the theoretical physics groups of the universities in Amsterdam, Leiden and Utrecht.
- The *Casimir Research School*; a collaboration with the Delft University of Technology, meant to broaden the PhD training in Physics, which provides an intellectually stimulating environment.
- The *Graduate School for the Structure and Function of Bio-Macromolecules (BIOMAC)*; between research groups of LION and the Leiden Institute for Chemistry (LIC).

The theoretical and experimental Physics research done at LION can be divided into different domains and sub-domains:

- *Theoretical Physics*
 - High-energy physics & particle cosmology
 - Theoretical physics of life processes
 - Condensed matter theory
- *Quantum Optics and Quantum Information*
 - Photon entanglement in various geometries
- *Biological and Molecular Physics*
 - Experimental biophysics
 - Molecular Nanooptics and Spins
- *Condensed Matter Physics*
 - Quantum- and Nanophysics
 - Interface Physics
 - Granular and Disordered Media

The various research groups in LION have an outstanding international reputation. They offer an excellent environment for a highly recognised education in Physics. International research experience is facilitated through European networks. English is the common language since the PhD students and postdocs come from all over the world. Most of the MSc graduates continue with a PhD project in LION or elsewhere. Graduates with both a MSc or a PhD easily find positions in high-tech industry, software and consultancy companies and in research institutions worldwide.

There is a number of formal co-operations and relations with other national and international research establishments that add to the quality and diversity of the MSc.

As mentioned above, LION participates in the research/graduate schools DRSTP and Casimir.

On an individual or workgroup level, members of the institute participate in many national and international research collaborations, e.g. the Dutch Polymer Institute, ESF programmes and networks/science programmes of the EU. They also make use of (inter)national research facilities, such as centres for high

magnetic fields and heavy ion irradiation, neutron, muon and synchrotron sources.

The Lorentz Center for Astronomy, Mathematics, Physics, and Computer Sciences organises a variety of international workshops of one or more weeks. The workshops are of great interest to both staff and students. Its present director is prof. dr. Arjen Doelman, staff member of the Mathematics Institute at the University Leiden. The Lorentz Center is located close to the institute on the 3rd floor of the Oort building.

Each year LION has paid positions available for PhD students. After obtaining the MSc degree it is possible to apply for these PhD positions. Additionally, it may be possible to enter the PhD programme on the basis of self-obtained grants. The PhD programme takes another four years and involves research and coursework. For vacancies, you should check the website: www.physics.leidenuniv.nl/vacancies.asp.

Rules and Regulations

In the Student Charter ('Studentenstatuut' in Dutch) all rights and obligations of students, the University, Faculty and the programme are laid down. Besides being a collection of all rights and obligations, the Student Charter also lists all facilities provided by the University available to students.

The charter also contains an overview of the legal protection of students.

The rights and obligations laid down in the Student Charter are derived from the legislation of the Higher Education and Research Act ('Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek', WHW).

Every student is deemed to have taken notice of all parts of the Student Charter.

The charter comprises two parts. The Institutional part is equal for all students and can be found on the website of the University www.regulations.leiden.edu/education-students/student-charter.html and a hard copy is made available at PITSstop (Information and Support Services & Information Desk Plexus Student Centre).

The departmental part of the charter addresses students of a specific programme and comprises two parts: the Course and Examination Regulations (OER in Dutch) and the Rules and Regulations for the examinations, practicals and final examinations (R&R). In the OER and R&R a.o. the rules of the Faculty regarding admission, examinations, the degree programme and organisation are laid down.

The text of these documents can be found on the website of the faculty www.science.leidenuniv.nl >> Graduate School >> MSc Regulations

ULCN account

Upon registration at the University every student receives a student number and accompanying ULCN account. The ULCN account provides access to the following facilities.

- **Work stations**
Access to work stations (PCs) stations in the faculties, in Plexus student centre and the University Library.
- **Leiden University Wireless Access (LUWA)**
LUWA provides wireless access to internet with your own laptop.
- **uMail**
Access to your uMailbox, including mail forwarding to an alternative mail address.
- **uSis**

Registering and deregistering for exams, work groups and courses, applying for exam results and notifying change of address.

- **uPrefs**
Here you can change your ULCN password and create extra settings for Blackboard
- **Blackboard**
Access to the digital teaching environment
- **UB Catalogue**
Searching for books and journals (including electronic journals) in the libraries of University Leiden Libraries.
- **Digital Library**
Access to catalogues, bibliographic files, full-text sources and electronic journals of University Leiden Libraries.
- **eStemmen**
Voting for student members of faculty and university boards
- **Surfspot**
Ordering software via a campus licence.
- **Weblog**
Maintaining a blog, including an academic blog

When you have problems with your account, please contact your local ICT-helpdesk.

uSis

In uSis – www.usis.leidenuniv.nl – all student information such as addresses, programme and grades are registered. Students can monitor their own progress. Registration for courses, examinations, minors etc. should be done via uSis.

More information on the system, manuals and FAQs can be found on: <http://students.leiden.edu/student-life/student-facilities/>

Study Requirement (Studyplan)

For every student an advisement report with his/her study requirements are laid down. This report, also known as studyplan, is an overview of the master degree programme to which the student must comply in order to obtain the master degree.

The requirements are the most important elements for students in uSis. It is of the utmost importance that students are registered correctly for their degree programme and – if applicable – the specialisation.

The requirements comprise all compulsory elements, limited and free choice of the programme. By means of the advisement report an easy overview can be obtained of all course registrations, obtained grades and outstanding elements, so progress is easily monitored.

Errors in the advisement report are best reported at the Graduate School Office via uSis-FWN@edufwn.leidenuniv.nl.

Petitions in uSis

The initial study requirements shown are based upon defaults for your specific academic program and plan combination. By using 'petition requests' it is possible to adjust these to your specific situation.

Your requirements may only be changed by the board of examiners (examen commissie). They need a petition request to analyze the situation. The board of examiners can accept or reject a petition request. If the petition request is accepted then your study requirements will be adjusted. You may submit a petition request for the following reasons:

- Request exemption for a particular subject
- Request a deviation in the number of study points required for a subject
- Request an extracurricular course
- Substitution of one course by another course that is offered by Leiden University
- Courses that have been studied in another university may be added via External Education
Mention at which university the course is taught, the course name, lecturer, number of EC and the starting date.
- Request for a (research) project or thesis.
Mention at which university, institute and department the project will be carried out, the supervisor, number of EC and the starting date.

Examinations and graduation

Registration for courses, examinations, tutorials, practicals

To be able to participate in educational programmes of the Faculty of Science students have to register via uSis. Without timely registration, participation may become impossible and potentially a grade cannot be registered.

Registration for courses opens six weeks before the start of the semester and closes one week before the activity commences.

Registration for a course includes the examination.

Registration for (a re-sit of) an examination is possible up to one week before the day of (the re-sit of) the examination. If conditions apply to participating in a second examination, they are laid down in the R&R. An oral examination does not require registration in uSis.

At the beginning of a master course, the course instructor will explain the examination method to the students and, if necessary, an examination date will be fixed. This information can also be found in the course descriptions on www.physics.leidenuniv.nl/edu/master/courses.asp.

For all exams there will be at least one possibility of redoing the exam in the course of each year. For these re-exams there will be no extra time for preparation made available in the schedule, as this would disrupt the normal study rhythm. Should students need a second re-exam in order to be able to continue their study at the desired pace, the study advisor will make a request to the lecturer. The lecturer will agree if he/she has the impression that the student in question has a reasonable chance of success.

Results of examinations

For every course covered by the final examination there is an appointed lecturer responsible for the teaching and the evaluation via an examination procedure. Evaluation is given by a grade between 1 and 10. Half integers are also permitted with the

exception of 5.5. The grade 6 or higher is considered as passed, the grade 5 as almost passed, and the grade 4.5 and lower as failed.

The results are made public by the lecturer via a listing, or in the case of an oral exam via an exam card (*tentamenkaart*) which is available from the Graduate School Office (*Educatief Centrum*). The grading of research projects should be done through a specific form that can be found on the website. The form can be downloaded on the website, www.physics.leidenuniv.nl/edu, under master<forms. This form should be signed by your supervisor, but also by a second assessor that gives a second opinion on the thesis and oral presentation.

The results listing can be looked at at the Graduate School Office (*Educatief Centrum*) where the evaluated exam papers can also be picked up.

The results given by the lecturer will be filed in the students' administration system, USIS. The student can view and check his or her own results via his or her account at: <http://usis.leidenuniv.nl>.

The graduation procedure

Graduation of the master programmes in Physics takes place after a formal final examination.

The student who expects that he/she is able to graduate within a few months is requested to contact the study advisor/coordinator to determine whether all criteria are (about to be) fulfilled, and to set the date on which the graduation will take place.

The graduations usually take place every last Tuesday of each month, according to the schedule in the next paragraph.

At least five weeks before the desired graduation date the student hands over to the Graduate School Office:

- the 'study plan' of the fulfilled programme, signed for correct by the Board of Examiners;
- a copy of all written or electronic notifications of the relevant passed examinations on extra-curricular components
- a copy of the front page of the final report of a research project;
- a copy of the certificate of the previous education (not needed if it concerns a certificate of the Faculty);
- Five weeks before graduation all components of the study programme should be finished. If a maximum of one grade is still missing, the lecturer or supervisor has to state that the last grade will be handed in no later than two weeks before the graduation date. If the missing grade concerns the research project, please read the information on page 31 on finishing a research project.
- Approximately two weeks before the graduation date, the Graduate School Office sends out an official invitation with a specification of the time and location of the graduation.

At least three LION staff members should be present at the final examination. The chairman should be a professor or an associate professor (UHD), for example the supervisor during the research project. Two other members can be lecturers of the master courses. External lecturers or supervisors can also be present at the examination and may participate in the questioning. This should be discussed with the chairman.

On the study plan form students are asked to suggest the names of the staff members that will represent the Board of Examiners during the final examination. Students are advised to check whether these staff members are available on the date of the final examination, since it is in the interest of the student to know who will participate in the questioning. In case of difficulty finding enough available staff members, students can contact the programme coordinator.

The date on which the last grade is handed in will count as the formal exam date, although the actual graduation takes place on another date. If all grades have been handed in before the beginning of the new academic year (end of August) the student will not be required to register as a student for the new academic year.

Questions concerning the contents of the exam or the graduation itself can be directed to the programme coordinator. Questions concerning the graduation procedure and the administrative part should be directed to the Graduate School Office.

Graduation dates and location

The graduation always take place on Tuesdays (usually the last Tuesday of the month) at the Academiegebouw, Rapenburg 73 in Leiden.

- August 24, 2010
- September 28, 2010
- October 26, 2010
- November 23, 2010
- December 14, 2010
- January 25, 2011
- February 22, 2011
- March 22, 2011
- April 23, 2011
- May 24, 2011
- June 28, 2011
- August 23, 2011

Course and Examination Regulations

The student charter is a collection of all the rights and duties of students. In addition, it gives an indication of the university facilities available to students and a summary of the legal protection of students.

The charter consists of two sections. The institutional section, which is the same for all students, is available via internet, at: www.studentenstatuut.leidenuniv.nl (in Dutch). The educational section, with the information on the study programme, courses and examination regulations can be found at www.science.leidenuniv.nl/oer.

This charter is the student charter as referred to in art. 7.59 of the Higher Education and Research Act (WHW). The student charter is also binding for the university. To some extent, rights and obligations are described which are established in legal stipulations. A summary of the relevant legal and university regulations can be found in the institutional section.

The university regulations are available for viewing at the Plexus Student Information Meeting Point (PITSstop) and the student information centre. Appeals and objection procedures are in place to enforce compliance with the regulations, should this be necessary.

Who can help you with your questions?

Personal circumstances	Improve personal functioning	Study skills / approach
<ul style="list-style-type: none"> – study advisor – student counselor 	<ul style="list-style-type: none"> – study advisor – courses ICS 	<ul style="list-style-type: none"> – study advisor – courses ICS
Change study?	Financial matters	Application
<ul style="list-style-type: none"> – study advisor – student counselor – study options test 	<ul style="list-style-type: none"> – student counselor – DUO – foundations – study advisor 	<ul style="list-style-type: none"> – Graduate School Office – Plexus – study advisor – IB-groep
Studying abroad	Final examination	Regulations
<ul style="list-style-type: none"> – International Office – supervisor research project / other staff member – study advisor – foundations 	<ul style="list-style-type: none"> – Graduate School Office – programme coordinator – study advisor 	<ul style="list-style-type: none"> – study advisor – Plexus – student counselor
Career prospects	Legal rights	Change of address
<ul style="list-style-type: none"> – BUL – website LION / UL – study advisor – ICS 	<ul style="list-style-type: none"> – student counselor – ombuds person – study advisor 	<ul style="list-style-type: none"> – uSis – DUO

For contact information: See the *List of addresses of the Faculty of Science and University of Leiden*.

List of lecturers

In this list you will find the rooms, the phone numbers and the e-mail addresses of most lecturers and other people involved in the master programmes.

Explanation of the abbreviations

- AMOLF = Instituut voor Atoom- en Molecuul Fysica,
Kruislaan 407 Amsterdam
- GL = Gorlaeus Laboratories,
Einsteinweg 55, PB 9502, 2300 RA Leiden
- HL = Huygens Laboratory,
Niels Bohrweg 2, 2300 RA Leiden
- IL = Instituut-Lorentz in Jan Hendrik Oort-building, see HL
- Oort = Jan Hendrik Oort-building, see HL
- Sn = Snellius, Niels Bohrweg 1, 2300 RA Leiden
- TUD = Technische Universiteit Delft

Naam Gebouw en kamernummer	Telefoonnummer E-mail adres
Aarts, prof.dr. J. Oort 159	+31 (0)71 527 5478 / 5475 aarts@physics.leidenuniv.nl
Aartsma, prof.dr. T.J. HL 1121b	+31 (0)71 527 5967 / 5475 aartsma@physics.leidenuniv.nl
Achúcarro, prof.dr. A. IL 269	+31 (0)71 527 5518 achucar@lorentz.leidenuniv.nl
Baal, prof.dr. P.J. van IL 265	+31 (0)71 527 5502 vanbaal@lorentz.leidenuniv.nl
Barkema, prof.dr. G.T. IL 257	+31 (0)71 527 5522 barkema@lorentz.leidenuniv.nl
Beenakker, prof.dr. C.W.J. IL 261	+31 (0)71 527 5532 beenakker@lorentz.leidenuniv.nl
Beijersbergen, prof.dr. M.W. Cosine, Niels Bohrweg 11, Leiden	+31 (0)71 5284964 m.beijersbergen@cosine.nl
Blöte, prof.dr. H.W.J. IL 263 / TUD	+31 (0)71 527 5523/ 015-2786156 bloete@lorentz.leidenuniv.nl
Boer, dr. F.S. de Sn 163	+31 (0)71 5277069 fdeboer@liacs.nl

Bouwmeester, prof. D. HL 922b	+31 (0)71 5275892 bouwmeester@molphys.leidenuniv.nl
Brandl, dr. B. Oort 535	+31 (0)71 527 5853 brandl@strw.leidenuniv.nl
Brinchmann, dr. J. Oort 541	+31 (0)71 527 18470 jarle@mail.strw.leidenuniv.nl
Brown, dr. A.G.A. Oort 560	+31 (0)71527 5884 brown@strw.leidenuniv.nl
Degenaars, drs. G. Sn 104	+31 (0)71 527 4354 degenaars@sbb.leidenuniv.nl
Dekker Lorentzweg 1, Delft, room F 084	(+31) (0)15 278 3219 N.H.Dekker@tudelft.nl
Denteneer, dr. P.J.H. IL 235	+31 (0)71 527 5508 pjhdent@lorentz.leidenuniv.nl
Deul, dr. E.R. HL 509a	+31 (0)71 527 5827 deul@strw.leidenuniv.nl
Dishoeck, prof.dr. E.F.van HL 505	+31 (0)71 527 5814 ewine@strw.leidenuniv.nl
Dogterom, prof.dr. M. AMOLF, A'dam	(020) 6081234 dogterom@amolf.nl
Dood, dr. M.J.A. de HL 909c	+31 (0)71 527 5929 mdedood@molphys.leidenuniv.nl
Edixhoven, Prof.dr. S.J. Sn 236	+31 (0)71-5277136 edix@math.leidenuniv.nl
Eliel, dr. E.R. HL 906	+31 (0)71 527 5895 eliel@molphys.leidenuniv.nl
Emmerich, dr. M.T.M. Sn 147	+31 (0)71 5277903 emmerich@liacs.nl
Exter, dr. M.P. van HL 916b / 928	+31 (0)71 527 5927 / 5924 mvexter@molphys.leidenuniv.nl
Filippi, dr. C. IL 239	+31 (0)71 527 5220 filippi@lorentz.leidenuniv.nl
Finkelberg, dr. H. Sn 224	+31 (0)71 527 7124 finkelberg@math.leidenuniv.nl
Franx, prof.dr. M. Oort 553	+31 (0)71 527 5870 franx@strw.leidenuniv.nl
Frenken, prof.dr. J.W.M. Oort 163	+31 (0)71 527 5603 frenken@physics.leidenuniv.nl
Gaans, dr. O.W. van Sn 222	+31 (0)71 527 7122 vangaans@math.leidenuniv.nl

Garrett, prof.dr. M.A.	--
Oort 571	garrett@strw.leidenuniv.nl
Gast, dr. P.	+31 (0)71 527 5979
HL 816b	gast@physics.leidenuniv.nl
Gill, prof.dr. R.D.	+31 (0)71 527 7137
Sn 230	gill@math.leidenuniv.nl
Gorkom, dr. H.J. van	+31 (0)71 527 5981
HL 1109a	gorkom@physics.leidenuniv.nl
Graaf, dr. J.M. de	+31 (0)71 527 7051
Sn 151	graaf@liacs.nl
Griend, dr. J.A. van de	+31 (0)71 527 7045
Sn 221	vdgriend@math.leidenuniv.nl
Groenen, prof.dr. E.J.J.	+31 (0)71 527 5914
HL 809b	groenen@molphys.leidenuniv.nl
Hecke, prof.dr. M. van	+31 (0)71 527 5482
Oort 167/HL601	mvhecke@physics.leidenuniv.nl
Hille, dr. S.C.	+31 (0)71 527 7112
Sn 214	shille@math.leidenuniv.nl
Hoekstra, dr. H.	+31 (0)71 527 5594
Oort 457	hoekstra@strw.leidenuniv.nl
Hogerheijde, dr. M.R.	+31 (0)71 527 5590
Oort 537	michiel@strw.leidenuniv.nl
Hollander, prof.dr. W.Th.F. den	+31 (0)71 527 7105
Sn 216	denholla@math.leidenuniv.nl
Hooft, prof.dr. G.W. 't	+31 (0)71 527 5930
HL 909b	thoof@philips.com
Hoogeboom, dr. H.J.	+31 (0)71 527 7062
Sn 162	hoogeboom@liacs.nl
Hopman, dr. C.	+31 (0)71 527 8449
Oort 561	clovis@strw.leidenuniv.nl
Holten, prof.dr. J.W.	071-527 5523 / 020- 592 5131
HL 263	vholten@lorentz.leidenuniv.nl
Hout, prof.dr. R. van der	+31 (0)71 527 7124
Sn 224	houtr@math.leidenuniv.nl
Huber, dr. M.I.	+31 (0)71 527 5560
HL 816a	mhuber@molphys.leidenuniv.nl
Icke, prof.dr. V.	+31 (0)71 527 5843
Oort 470	icke@strw.leidenuniv.nl
Israel, prof.dr. F.P.	+31 (0)71 527 5891
Oort 570	israel@strw.leidenuniv.nl

Jaffe, dr. W.J. Oort 563	+31 (0)71 527 5862 jaffe@strw.leidenuniv.nl
Jeu, dr. M.F.E. de Sn 218	+31 (0)71 527 7118 mdejeu@math.leidenuniv.nl
Jochemsen, dr. R. Oort 165	+31 (0)71 527 5442 jochemsen@physics.leidenuniv.nl
Jong, prof.dr. M. de Oort 263	(020) 592 5523 mjg@nikhef.nl
Jousma, dr. H. Sn 131	+31 (0)71 527 4424 h.jousma@fwnbur.leidenuniv.nl
Kallenberg, prof.dr. L.C.M. Sn 223	+31 (0)71 527 7130 kallenberg@math.leidenuniv.nl
Katgert, dr. P. HL 502	+31 (0)71 527 5817 katgert@strw.leidenuniv.nl
Kes, prof.dr. P.H. Oort 157	+31 (0)71 527 5472 / 5475 kes@physics.leidenuniv.nl
Kleijn, dr. H.C.M. Sn 124	+31 (0)71 527 7064 kleijn@liacs.nl
Kooman, dr. R.J. Sn 203c	+31 (0)71 527 7135 kooman@math.leidenuniv.nl
Koren, prof.dr.ir. B. Sn 226	+31 (0)71 527 7126 barry.koren@math.leidenuniv.nl
Kosters, dr. W.A. Sn 159	+31 (0)71 527 7059 kosters@liacs.nl
Kuijken, prof.dr. K.H. Oort 571	+31 (0)71 527 5848 kuijken@strw.leidenuniv.nl
Lenstra, prof.dr. H.W. Sn 227	+31 (0)71 527 7127 hwl@math.leidenuniv.nl
Levin, dr. Y. Oort 459	+31 (0)71 527 8473 yuri@lorentz.leidenuniv.nl
Linnartz, prof.dr. H.V.J. HL 501	+31 (0)71 527 5804 linnartz@strw.leidenuniv.nl
Lub, dr. J. Oort 564	+31 (0)71 527 5840 lub@strw.leidenuniv.nl
Lübke, dr. M. Sn 234	+31 (0)71 527 7110 lubke@math.leidenuniv.nl
Luijk, dr. R.M. van Sn 229	+31 (0)71 527 7093 rvl@math.leidenuniv.nl
Lunteren, prof.dr. F.H. van Oort 571	+31 (0)71 527 8412 vlunteren@strw.leidenuniv.nl

Miley, prof.dr. G.K. HL424	+31 (0)71 527 5849 miley@strw.leidenuniv.nl
Molen, dr.ir.S.J. van der	+31 (0)71 527 5461
Mulder, drs. G.. HL 302	+31 (0)71 527 1715 mulder@physics.leidenuniv.nl
Oort 158	molen@physics.leidenuniv.nl
Nienhuis, prof.dr. G. HL 904	+31 (0)71 527 5822 nienhuis@molphys.leidenuniv.nl
Noort, dr. Ir.S.J.T. van HL 1109b	+31 (0)71 527 5980 noort@physics.leidenuniv.nl
Oosterkamp, dr. ir. T.H. Oort 161	+31 (0)71 527 5424 oosterkamp@physics.leidenuniv.nl
Orrit, prof.dr. M. HL 806	+31 (0)71 527 1720 orrit@molphys.leidenuniv.nl
Poole, drs. R.S. Le Oort 541	+31 (0)71 527 5871 lepole@strw.leidenuniv.nl
Rost, dr.dipl.phys. M.J Oort 168a	+31 (0)71 527 1883 / 5574 rost@physics.leidenuniv.nl
Röttgering, dr. H.J.A. Oort 465	+31 (0)71 527 5851 rottgeri@strw.leidenuniv.nl
Rottschäfer, dr. V. Sn 213	+31 (0)71 527 7113 vivi@math.leidenuniv.nl
Ruitenbeek, prof.dr. J. van Oort 164	+31 (0)71 527 5450 ruitenbeek@physics.leidenuniv.nl
Saarloos, prof. dr. ir. W. van IL 271	+31 (0)71 527 5501 saarloos@lorentz.leidenuniv.nl
Schalm, dr. K.E. Oort 241	+31 (0)71 527 5516 kschalm@lorentz.leidenuniv.nl
Schaye, dr. J. Oort 537	+31 (0)71 527 8443 schaye@strw.leidenuniv.nl
Schiessel, prof.dr. H. Oort 255	+31 (0)71 527 1543 Schiessel@lorentz.leidenuniv.nl
Schmidt, prof.dr. Th. HL1116a	+31 (0)71 527 5982 schmidt@physics.leidenuniv.nl
Smit, dr. B. de Sn 244	+31 (0)71 527 7144 desmit@math.leidenuniv.nl
Snellen, dr. I. Oort 439	+31 (0)71 5275838 snellen@strw.leidenuniv.nl
Spieksma, dr. F.M. Sn 228	+31 (0)71 527 7128 spieksma@math.leidenuniv.nl

Spijker, prof.dr. M.N. Sn 206b	+31 (0)71 527 7091 spijker@math.leidenuniv.nl
Stefanov, dr. ir. T.P. Sn 122	+31 (0)71 527 5775 stefanov@liacs.nl
Stevenhagen, prof.dr. P. Sn 246	+31 (0)71 527 7125 psh@math.leidenuniv.nl
Stuik, dr. R. HL 528	+31 (0)71 527 5572 stuik@strw.leidenuniv.nl
Taelman, dr. L.D.J. Sn 228	+31 (0)71 527 7045 lenny@math.leidenuniv.nl
Tijdeman, prof.dr. R. Sn 238	+31 (0)71 527 7138 tijdeman@math.leidenuniv.nl
Verduyn Lunel, prof.dr. S.M. Sn 204	+31 (0)71 527 7123 verduyn@math.leidenuniv.nl
Vitelli, dr. V IL 271	+31 (0)71 527 5501 vitelli@lorentz.leidenuniv.nl
Völker, prof.dr. S.L. HL 901	+31 (0)71 527 5859 silvia@molphys.leidenuniv.nl
Vrijdaghs, drs. J.B. HL 116a	+31 (0)71 527 5763 vrijdaghs@physics.leidenuniv.nl
Werf, dr. P.P. van der Oort 565	+31 (0)71 527 5883 pvdwerf@strw.leidenuniv.nl
Woerdman, prof.dr. J.P. HL 905	+31 (0)71 527 5823 woerdman@molphys.leidenuniv.nl
Zaenen, prof.dr. J. IL 237	+31 (0)71 527 5506 jan@lorentz.leidenuniv.nl
Zwet, dr. E.W. van Sn 219	+31 (0)71 527 7119 evanzwet@math.leidenuniv.nl

Addresses of Leiden University

Leiden University is a large institution with many organisations, many buildings and a large amount of information being offered. It is often difficult for a student to find the right direction. If you don't know which department you need, the address list given below is quite useful.

If you don't know where you can find an answer to your question, you can always knock on the door of your study advisor. The staff members of the Student Information Center

(Studenteninformatiecentrum PLEXUS) can also provide answers to the many questions of the students and can point them in the right direction.

A lot of important information which you need as a student enrolled at Leiden University can be found on the website of the University, www.leidenuniv.nl, under 'students'.

Faculty of Science

Graduate School Office (Educatief Centrum)

Mrs. Letty Dubbeldam

Huygens Laboratory, Niels Bohrweg 2, Room 123

physics@edufwn.leidenuniv.nl

Office hours: 10:00 – 15:00

International Office

Ms. G. Schildwacht

Huygenslaboratorium (Huygens Laboratory), room 1.27

Niels Bohrweg 2

Room 127

Telephone (071) 527 5783 (Mon/Tue/Thurs/Fri)

schildwacht@edufwn.leidenuniv.nl

Leiden University

Admission's Office Leiden University:

Plexus Students Centre, Kaiserstraat 25, Leiden,
tel. (071) 527 8011, e-mail: study@ics.leidenuniv.nl

BUL: Bureau for counselling in the job market,
Leiden University. Plexus, tel. (071) 527 8011,
e-mail: BUL@ics.leidenuniv.nl, website: www.bul.leidenuniv.nl.

Funds:

Curatorenfonds of the University (application via study advisors),
private funds (*fondsenboek* and disk at the *Studie-Infotheek*:
Plexus), *Noodfonds* of the University (application via study
advisors), LUF (for information, web site: www.luf.nl or e-mail:
algemeen@luf.leidenuniv.nl).

Plexus Students Centre:

Counter for all student affairs.
Kaiserstraat 25, Leiden, tel. (071) 527 8011.

Student counselors (general): Plexus Students Centre,
tel. (071) 527 8026, e-mail: decanen@ics.leidenuniv.nl.

ULCN University Leiden Computer Network:

<http://ulcn.leidenuniv.nl/students/> for questions about ULCN-account,
change of address, U-twist, Blackboard etc.

In addition

Dienst Uitvoering Onderwijs (formerly IBG)

Regiokantoor DUO (Regional Office)

Koninginnegracht 12b/13, 2514 AA Den Haag,

tel. 050 599 77 55

Office hours: Monday through Friday from 9:00 to 17:00 o'clock.

vragen@ocwduo.nl / www.ocwduo.nl

Leiden's Students Housing (*Stichting Leidse Studentenhuisvesting SLS*)

Visiting address: Doelengracht 4b, 2311 VM, Leiden

Postal address: Postbus 11275, 2301 EG, Leiden

Telephone (071) 516 1718, www.sls.nl

Public Holidays and other events

When	What	Where
August 10 - 14	El Cid student introduction	Leiden (city)
August 17-26	Acculturation week international students	Leiden (city)
August 27-28	Introduction Days international students	Leiden (city)
October 4	Leidens Ontzet (October 3)	Holiday
October 18	Science Day (Sunday!)	Leiden University
December 25-26	Christmas	Holiday
January 1	New Year	Holiday
January 28-29	Introduction Days International students	Leiden (city)
February 8	Dies Natalis	Pieterskerk
March 10	<i>Bètabanenmarkt</i> (job fair)	Gorlaeus Laboratoria
April 2	Good Friday	Holiday
April 5	Easter Monday	Holiday
April 30	<i>Koninginnedag</i> (Queen's Birthday)	Holiday
May 5	Liberation Day	Holiday
May 13	Ascension Day	Holiday
May 24	Whit-Monday	Holiday

PHYSICS COURSES										ASTRONOMY COURSES										Schedule of MASTER COURSES, fall 2010																				
wk	MONDAY								TUESDAY								WEDNESDAY								THURSDAY								FRIDAY							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
35	Science Day																																							
36	INF / NT / TTP								QT																															
37	INF / NT / TTP								TGR								QT QT								SP OE TGR IM RA /BP NT															
38	INF / NT / TTP																QT TGR								SP SP OE TGR IM RA /BP NT															
39	INF / NT / TTP																QT QT								SP RA OE TGR IM RA /BP NT															
40	Leids ... NT ... ontzet ...								QT TGR								SP SP OE TGR IM RA /BP NT								APP SD															
41	INF / NT / TTP								TGR								QT QT								SP OE TGR IM RA /BP NT								APP SD							
42	INF / NT / TTP																QT								SP SP OE IM RA /BP NT								APP SD							
43	INF / NT / TTP								TGR								QT QT								SP OE TGR IM RA /BP NT								APP SD							
44	INF / NT / TTP																QT TGR								SP SP OE TGR IM RA /BP NT								APP SD							
45	INF / NT / TTP																QT QT								SP OE IM RA /BP NT								APP SD							
46	INF / NT / TTP								TC								QT								SP SP OE TC IM RA /BP NT								APP SD							
47	INF / NT / TTP								TC								QT QT								SP OE TC IM RA /BP NT								APP SD							
48	INF / NT / TTP								TC								QT								SP SP OE TC IM RA /BP NT								APP SD							
49	INF / NT / TTP																QT QT								SP OE IM RA /BP NT								SD							
50	INF / NT / TTP								NT TGR+TC																SP SP OE								BP NT							
51	INF / NT / TTP																																							
52	Christmas-Holidays																Christmas-Holidays																							

¹⁾ INF is scheduled at hours 2 and 3; NT at hours 3 and 4; TTP at hours 2,3 and 4.

Legends Fall 2010:					30.07.10	
Abbreviation	Course name	Lecturer(s)	Level	EC	Location	
APP	Introduction to Astro-Particle Physics	De Jong	400	6	HL 204	
BP	Biophysics	Keymer	400	6	Delft	
IM	Interstellar Medium	Hogerheijde	500	6	HL 427	
INF	Interferometry	Jaffe	500	6	HL 427	
NT	Nanotechnology	Drift/Alkemade	400	6	Delft	
OE	Origin and Evolution of the Universe	Kuijken	500	6	HL 427	
QT	Quantum Theory	Denteneer	400	9	HL 204	
RA	Radio Astronomy	Garrett	400	6	HL 427	
Science Day	Sterrewacht Science Day	Various			De Sitter	
SD	Stellar Dynamics	Portegies Zwart	450	6	HL 427	
SP	Statistical Physics	Schiessel	400	9	HL 204	
TC	Theoretical Cosmology	Achúcarro	500	3	HL 204	
TGR	Theory of General Relativity	Achúcarro	400	6	HL 204	
TTP	Topics in Theoretical Physics: Fluid Dynamics	Vitelli	500	9	HL 204	

hours:
1: 09.00 - 09.45
2: 10.00 - 10.45
3: 11.15 - 12.00
4: 12.15 - 13.00
5: 13.45 - 14.30
6: 14.45 - 15.30
7: 15.45 - 16.30
8: 16.45 - 17.30

PHYSICS COURSES ASTRONOMY COURSES Schedule of MASTER COURSES, spring 2011

wk	MONDAY								TUESDAY								WEDNESDAY								THURSDAY								FRIDAY								wk
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
5	jan 31		SPM		¹ CA / QOO			EFT	SMO			TCM				PPEU			EFT	SE/	AB	DL		GF																	
6	feb 7		SPM		¹ CA / QOO			EFT	SMO			TCM				PPEU			EFT	SE/	AB	DL		GF																	
7	14		SPM		¹ CA / QOO			EFT	SMO	DL		TCM				PPEU			EFT	SE/	AB	DL		GF					TCM												
8	21		SPM		¹ CA / QOO			EFT	SMO			TCM				PPEU			EFT	SE/	AB	DL		GF																	
9	28		SPM		¹ CA / QOO			EFT	SMO	DL		TCM							EFT	SE/	AB	DL		GF					TCM												
10	mrt 7		SPM		¹ CA / QOO			QFT	SMO			TCM				PPEU			QFT	SE/	AB	DL		GF																	
11	14		SPM		¹ CA / QOO			QFT	SMO	DL		TCM							QFT	SE/	AB	DL		GF					TCM												
12	21		SPM		¹ CA / QOO			QFT	SMO			TCM				PPEU			QFT	SE/	AB	DL		GF																	
13	28		SPM		¹ CA / QOO			QFT	SMO	DL		TCM							QFT	SE/	AB	DL		GF					TCM												
14	apr 4		SPM		¹ CA / QOO			QFT	SMO			TCM							QFT	SE/	AB	DL		GF																	
15	11		SPM		¹ CA / QOO			QFT	SMO	DL		TCM							QFT	SE/	AB	DL		GF					TCM												
16	18		SPM		QOO			QFT	SMO			TCM							QFT	SE/	AB	DL		GF																	
17	25		SPM		QOO			QFT	SMO	DL		TCM				IAC			QFT	SE/	AB	DL		GF					TCM												
18	mei 2		SPM		QOO			QFT	SMO			TCM				IAC			QFT	SE/	AB	DL		GF																	
19	9		SPM					QFT	SMO	DL		TCM				IAC			QFT	SE/	AB	DL		GF					TCM												
20	16		SPM						AC	AC						IAC			QFT	AC	AC																				
21	23		AC		AC				AC	AC						IAC				AC																					
22	30															IAC				Ascension																					
31	juni 6															IAC																									
32	13															IAC																									
33	20															IAC																									
34	27															IAC																									

¹ CA is scheduled at hours 5 and 6; QOO at hours 5,6 and 7.

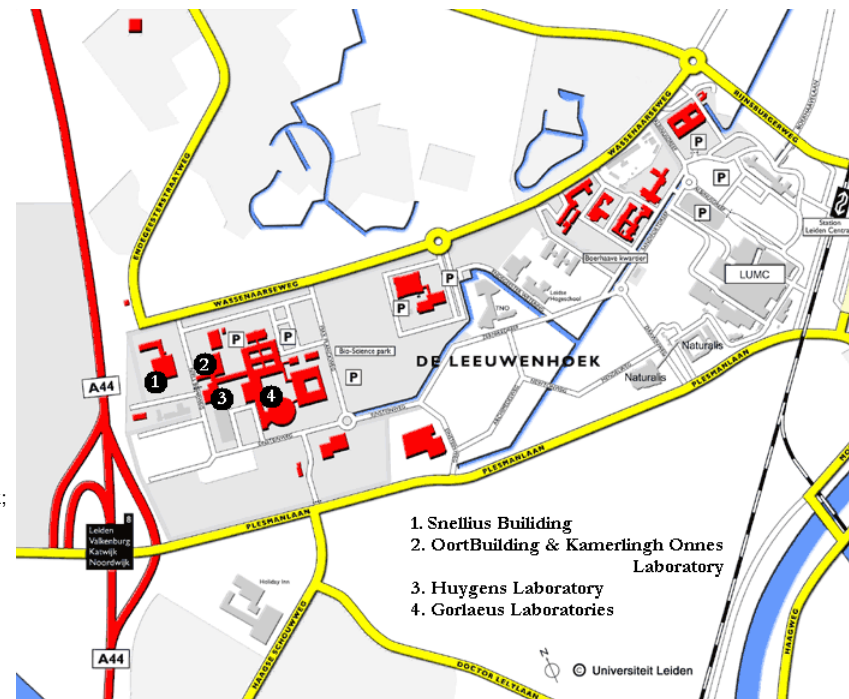
Legends Spring 2011:					
Abbreviation	Course name	Lecturer(s)	Level	EC	Location
AB	Advanced Biophysics	Dogterom	500	6	HL 204
AC	Astrochemistry	van Dishoeck	500	3	HL 427
CA	Computational Astrophysics	Portegies Zwart	400	3	HL 421
DL	Detection of Light	Kenworthy	400/500	6	HL 204
EFT	Effective Field Theory	Schalm	500	3	HL 204
GF	Large Scale Structure & Galaxy Formation	Brinchmann	500	6	HL 427
IAC	IAC 2011: History of Astronomy	Verbunt	400	6	Utrecht
PPEU	Particle Physics and Early Universe	Boyarsky	500	6	HL 204
QFT	Quantum Field Theory	Schalm	500	6	HL 204
QOO	Quantum Optics and Quantum Information	Nienhuis	500	9	HL 204
SE	Stellar Structure and Stellar Evolution	Schaye	500	6	HL 427
SMO	Single Molecular Optics	Orrit	500	6	HL 204
SPM	Scanning Probe Microscopy	Frenken	400/500	6	HL 204
TCM	Theory of Condensed Matter	Zaanen	500	9	HL 204

hours:
1: 09.00 - 09.45
2: 10.00 - 10.45
3: 11.15 - 12.00
4: 12.15 - 13.00
5: 13.45 - 14.30
6: 14.45 - 15.30
7: 15.45 - 16.30
8: 16.45 - 17.30

Map of Faculty of Science

Acces from Leiden Central Station

- bus 32, 37 en 38 direction Katwijk; busstop Transferium A44
- bus 43 direction Den Haag; busstop Universiteitsterrein
- bus 55 direction Lisse; busstop Transferium A44
- bus 57 direction Nieuw - Vennep; busstop Corpus of Gorlaeus
- bus 232 direction Noordwijk; busstop Transferium A44



Safety Information Leiden University

What to do in case of a fire, incident or other calamity?

DON'T CALL 112!

but

DO CALL THE EMERGENCY NUMBER (see the orange sticker on the phone or after office hours: 4444)

IN CASE OF FIRE

- ★ ACTIVATE the fire-alarm-button
- ★ In case of a STARTING OR SMALL FIRE
 - try to extinguish the fire
 - use the handheld extinguisher or the fire hose
- ★ In case of a LARGE FIRE
 - Close doors and windows
 - Go to the meeting point* (restaurant or car parking) and follow instructions of the first-aid-personnel (BHV-ers)

What to do if the Alarm Signal ("Slow Whoop") sounds?

CLOSE WINDOWS, LEAVE THE ROOM AND CLOSE THE DOOR.

- ★ Follow the ESCAPE ROUTE (green pictogram plates)
- ★ In CASE OF FIRE use the stairs and NEVER the elevator!

Go to the MEETING POINT* (restaurant or car parking)

- ★ Don't go home. All people who were present in the building have to be registered
- ★ Don't make the firemen look for you unnecessarily

Always FOLLOW THE INSTRUCTIONS of the firemen or the first-aid-personnel (BHV-ers)

What to do when a dangerous situation is discovered?

Fill out a REGISTRATION form

- ★ digital on amd.leidenuniv.nl
- ★ the red paper available at the reception

or

CONTACT the safety office of the faculty

- ★ amd@science.leidenuniv.nl
- ★ 071 – 527 4333

* MEETING POINTS are indicated in the EVACUATION PLAN (ontruimingsplan) of each building. This plan is available at the reception or on amd.leidenuniv.nl/e/

