Facts, procedures and rules for the master program Theoretical Physics 2014-2015

Beware of the EER

General regulations and procedures of the master programs of the Graduate School of Natural Sciences are formulated in the EER (Education and Exam Regulations, in Dutch: OER), and TP-specific elements are formulated in the TP annex. Students and lecturers are supposed to be aware of the contents of the EER and the annex.

Disclaimer: This document describes facts and working rules of good practice that should not conflict with the EER. In case of conflicting formulation, the EER applies.

Facts

The master program Theoretical Physics (TP) of Utrecht University is a 2-years program of 120 ECTS, taught in English. The program consists of 30 ECTS compulsory elements, 22.5 ECTS primary elective theoretical physics courses, 7.5 ECTS mathematics, 15 ECTS secondary elective courses, and a research thesis of 45 ECTS. Moreover, attending 18 ITP-colloquium sessions is mandatory.

The program builds upon the two compulsory courses Quantum Field Theory (QFT) and Statistical Field Theory (SFT), both 10 ECTS and both taught in the Fall semester. It is natural to take QFT and SFT at an early stage, preferably during the first semester in the program. Also the Student Seminar (10 ECTS) is compulsory. The Student Seminar, which takes place in the Fall semester and which is aimed at TP students in their third semester, consists of bi-weekly meetings on Wednesday afternoon during which the participating students not only get acquainted with a specific topic in theoretical physics but also with literature searches, oral and written presentations, discussions, etc.

In 2014-2015 the set of offered primary elective courses (all 7.5 ECTS) is:

- General Relativity (fall, Prokopec)
- Advanced Topics in Theoretical Physics II (fall, DITP-course, UU contribution from Prokopec and visiting professor Starobinsky, on non-equilibrium field theory and cosmology, lectures in Utrecht, information and contact: Morais-Smith + Prokopec)
- Modelling & Simulation (spring, Dijkstra + Barkema)
- String Theory (spring, Gürsoy)
- Soft Consensed Matter Theory (spring, Van Roij + Van der Schoot)
- Cosmology (spring, Pajer)
- Field Theory in Particle Physics (spring, De Wit + Laenen, lectures in Amsterdam)
- Theory for Technology (any time, mini research project with TU/e, contact: Van der Schoot)
- Advanced Topics in Theoretical Physics I (spring, DITP-course, UU contribution from Schuricht, on quantum condensed matter, lectures in Amsterdam, information + contact: Morais-Smith + Schuricht)

TP master students should select at least three of these primary optional courses, where it is noted that ATTP-II builds upon SFT and QFT and is not suitable for starting TP students.

TP students must take 1 mathematics course, any course from the master math program qualifies and also the level-3 bachelor courses Differential Manifolds (WISB342), Complex functions
(WISB311), Topology and Geometry (WISB341), Measure and Integration (WISB312), Stochastic processes (WISB362), and Functional analysis (WISB315). Some of these bachelor courses may be taught in Dutch. Note that many master math courses have a load of 6 ECTS, and in these cases TP students are advised to ask the lecturer for an addition to increase the load to 7.5 ECTS.

TP students can further shape their personal program by selecting two courses of 7.5 ECTS offered by any master program of the Graduate School of Natural Sciences. This includes the list of primary electives above, but also other mathematics courses, or courses offered in the programs experimental physics, chemistry, computer science, and history & philosophy of science.

**Problem class attendance**
Most courses of the master program TP consist of a weekly lecture (2 x 45 minutes) by an ITP staff member and a problem class session (3hrs) supervised by TA’s of the ITP. These problem class sessions are a service to the master students, and involve a substantial effort in terms of ITP manpower. It is therefore expected that all participants of a course actively participate by default, and sign the attendance-list of at least 75% of the sessions –this amounts to being present at least 12 of the usual 16 weeks. This list will circulate in the first 15 minutes of the problem class session, and signing implies full attendance. Exceptions are to be discussed with the lecturer in advance, and sanctions for poor attendance, at the discretion of the responsible lecturer, will be communicated at the beginning of the course.

**Colloquium attendance**
The biweekly “Nico van Kampen Colloquium for Theoretical Physics” as organized by the ITP is a key ingredient of the master program TP, in which students get exposed to the full breadth of (theoretical) physics. In order to qualify for a master degree TP students must attend at least 18 sessions out of 36 that get organized during two years. An attendance list will circulate during the first 15 minutes of the colloquium, which cannot be signed afterwards (barring exceptions approved by an ITP staff member). In order to better prepare TP students to the colloquium, an introductory talk will occasionally be presented one hour before the start of the colloquium. Attending these occasional preparatory talks, which will be announced in advance, is also compulsory.

Note that it is highly recommended to start attending the colloquium in the first year in the TP program already, not only to make sure to complete the set of 18 required sessions but also to get oriented optimally on the possibilities for MSc-thesis topics.

**Exam and retake rules**
The grading of most TP courses involves a final exam, combined with a midterm exam and/or hand-in exercises. The details vary from course to course, and are to be clearly stated (in writing) by the lecturer at the start of the course. Note that active participation to the problem class sessions is a necessary condition for access to the final exam. Every year there is one retake per course, which, however, is not open for those who scored below 4 or 6 and above in the regular (first) grading period. These TP rules are conform the EER of the Graduate School of Natural Sciences.

**Integrity and quality of hand-in work**
Hand-in exercises are an important part of the feed-back mechanism from lecturer/TA to student. The quality, readability, and exposure of this work must therefore be of such a standard that feedback is possible efficiently. Although it need not be type-set, it is necessary that steps and structure
are clearly indicated—it is required to rewrite and restyle actual erratic calculations in a way that allows for an efficient grading—in fact the process to have consideration with the reader is a key ingredient of scientific writing and must be trained anyway.

Moreover, in line with proper scientific integrity it is also mandatory to (i) provide references to (non-standard) sources other than the book/notes of use in the course, (ii) to mention key input from others (e.g. fellow students with whom the work was carried out or internet discussion forums). Moreover, handing-in work for grading also implies implicitly and explicitly that the work was actually done by the student, otherwise it will be considered as fraud if discovered with all due consequences as stated in the EER.

**Organisation of the MSc thesis**
Completing an MSc thesis of 45 ECTS (equivalent to 3/4 of the load of a standard academic year) is the final element of the master program TP. The thesis is supervised by one of the staff members of the ITP, usually directly but even if the thesis is written outside the ITP there must be an ITP-staff member who takes formal responsibility (which is to be arranged in advance).

Before the start of the MSc thesis, every TP student discusses his/her individual study program with the student advisor prof. C. Morais-Smith in order to establish (i) if study progress is sufficiently advanced to start the thesis project at all, (ii) if the planned and completed set of courses satisfies all the formal criteria for the MSc degree TP, and (iii) which supervisors are available for thesis projects.

In order to get acquainted with the research themes in the ITP, all TP students will in early September be invited to a meeting in which all ITP staff members present themselves and their research. This meeting, together with all the courses, the colloquium, and the advice of the study advisor, should facilitate an optimal choice. Further information can also be found on the ITP website and on personal websites of ITP staff members.

Each year there are two designated periods for conducting a thesis project, either September-June or February-November. The deadline for starting in either period is the last day of the initial month (i.e. Sep. 30 and Feb. 28), and the deadline for handing in the final version of the thesis to the supervisor is the last day of the last month (i.e. June 30 and Nov.30), respectively. Of course earlier versions of (part of) the thesis can be discussed with the supervisor prior to the actual hand-in deadline; this is to be mutually arranged between student and supervisor. In the weeks just before and after these hand-in deadlines, several opportunities for an oral presentation in the ITP will be scheduled, and the thesis will be evaluated and graded within four weeks after the submission deadline, such that graduation is possible at the end of August and January, respectively. Exceptions to this schedule are to be discussed with the study advisor and the thesis supervisor.

When a match between a supervisor and an MSc student has been established, a research plan is composed that includes (i) a brief description of the research topic, (ii) the projected time investment of the student, (iii) the supervision frequency, (iv) the date and the criteria of the go/no go evaluation after about three months, and (v) a co-supervisor within the ITP. The student is responsible for handing this form to the administration.
A positive intermediate ("go") evaluation implies that an extrapolation towards the hand-in deadline will lead to a completed thesis of sufficient quality, a negative ("no go") evaluation implies that a radical change of project/attitude.supervisor is needed in the form of a new project, which is to be started before the next possible starting deadline.

Failure to abide to the handing-in deadline after a positive "go" decision will by default lead to a one-and-only extension of the hand-in deadline by a maximum of 3 months and a reduction of the final grade by 1 on the scale of 10. A second extension will not be granted. In the case that the delay stems from serious unforeseen personal circumstances, to be discussed with the study advisor, the length of the extension and the consequence for the grading of the thesis will be agreed upon by the thesis supervisor, the co-supervisor, the study advisor, and the program director TP. The outcome will be communicated to the student by the supervisor.

Every thesis will be evaluated and graded on the basis of a standard evaluation form. The (formal) supervisor is responsible for a proper administration of this fully completed form.

Honor students following the TP and Mathematics master write a thesis of 60 ECTS. Starting dates, hand-in deadlines, and other conditions are identical to those for TP students.

Further information
All general questions regarding the master program TP can be addressed to the program leader (prof. R. van Roij, r.vanroij@uu.nl, 030-2537579, Minnaert Building 314). Specific questions on individual and personal issues such as the particular study program, problems, illness, etc, can be addressed to the study advisor (prof. C. Morais-Smith, c.demoraissmith@uu.nl, 030-2533062, Minnaert Building 306). Specific information on the content and of courses are to be addressed to the lecturer of the course.