

Summary of the IMPRS-HD thesis committee meeting

– for students enrolled for astronomy examination –

The IMPRS thesis committee for has decided in agreement with the student that the following curriculum should be attended in order to meet the IMPRS requirements. At least two advanced lectures must be attended, but two outside the thesis research field. IMPRS does not require to attend courses that have been completed previously, whether in Heidelberg or elsewhere. These courses which are accepted for the IMPRS curriculum should also be listed below.

	<u>Name of offered course</u>	<u>Description of course taken before</u>
[tick or cross out the whole line]	•Introductory to astronomy & astrophysics I+II	_____
	•2 IMPRS semester seminars (winter + summer term) + IMPRS workshop retreat	
	•Theoretical Astrophysics	_____
	•Galaxies	_____
	•Cosmology	_____
	•Stellar Physics	_____
	•Observational Methods	_____
	•Special Lecture: _____	_____
	•Other (e.g. softskills): _____	_____

Date:

Signatures:

Student: _____ Supervisor: _____

TC member 2: _____ TC member 3: _____

Note 1: Astronomy Lab Course (Praktikum). Participation is a formal requirement by the Faculty for all astronomy students. Exemption is possible and has to be formally applied for at the Dean of the Faculty for Physics and Astronomy.

Note 2: Teaching duties. This is a formal requirement by the Faculty for all graduate students. At least one „Semester-Deputat“ of teaching is required before registration for the final examination.

Note 3: HGSFP requirements. The Graduate School for Fundamental Physics requires 16 hours of courses during the 3 years of graduate studies. Usually, fulfillment of IMPRS requirement satisfies the HGSFP condition as well. Summer schools, conferences and the Graduate Days also count towards this, however.

Detailed information on requirements for IMPRS students (see also webpages of IMPRS and Faculty):

Certain requirements have to be met in order to get awarded a doctoral degree by Heidelberg University. Attendance of the IMPRS course program is certified by an additional IMPRS-HD certificate.

New students may find it confusing to find requirements for PhD studies from different "organisations" as IMPRS, the Faculty, and the Graduate School HGSFP. However, following IMPRS-HD rules is always safe. In case of questions, ask IMPRS coordinator Christian Fendt for help.

In the case a student aims for a doctoral degree in astronomy, Heidelberg University requires to follow the mandatory "plan of study" and asks the student to sign. In addition, participation in two seminars and the astronomy lab course is required.

For students aiming for a doctoral degree in physics the curriculum is different and has to be defined for each student individually (for IMPRS students by the thesis committee).

More details about the astronomy curriculum

Depending whether students aim for a doctoral degree in astronomy (the usual case for IMPRS students) or for a doctoral degree in physics (a rare case) they will have follow a slightly different curriculum. However all students meet together in the introductory astronomy block course in September, the theoretical astrophysics lecture during the winter term and the regular IMPRS seminar.

The program contains introductory and advanced courses, advanced lectures, seminars, and summer schools, all structured in a 2-year cycle, starting each year in September.

The courses are open also for non-IMPRS students and are held in English language.

Students will be able to finish with the lecture program within two years, leaving more time for finishing up their research work, completing their thesis and preparing the final disputation within three years.

Introductory lectures:

The introductory lectures are aimed for students, who enter IMPRS with yet limited knowledge in astronomy.

•**Introduction to astronomy I:** History in astronomy, time and position measurements, stars and the sun, planetary systems, observational instruments.

•**Introduction to astronomy II:** The Milky Way, normal galaxies, active galaxies, radio

galaxies, evolution cycle of matter, cosmology. These two lectures are offered as a three-week all-day class in September each year (block course).

•**Theoretical astrophysics:** Radiative processes, hydrodynamics, plasma physics, stellar dynamics, high energy physics. The introductory lectures present the basic knowledge for any student researching in astronomy, astrophysics or cosmic physics. This lecture is offered as semester course every winter term.

•**The astronomy lab course** is part of the basic lecture programme

Advanced courses (semester courses):

In a series of four advanced courses profound knowledge in key areas of Astronomy and Cosmic Physics will be presented. These lectures are offered as semester courses and block courses with a time schedule such that every IMPRS student should have the opportunity to attend.

•**Observational methods:** Telescopes, instrumentation, detectors, observational methods in the optical, IR, UV, radio-, and sub-mm range, X-ray and Gamma-ray observations, data analysis, data banks

•**Stellar Astronomy and Astrophysics:** Stellar structure, stellar atmospheres, star formation, stellar evolution, planet formation, planetary systems, interstellar matter

•**Galaxies:** Galactic structure, dynamics, and evolution, star clusters, hot stellar systems, structure and dynamics of the ISM, star forming regions, galaxy clusters, intergalactic medium

In addition to these university requirements for all students, all IMPRS students are obliged to attend the introductory courses (if they have not attended these courses elsewhere), the IMPRS seminar and at least one of the summer schools.

In addition, IMPRS students aiming for a doctoral degree in astronomy are obliged to attend **two lectures of advanced course program, but two outside their own research field.** All astronomy students (incl. IMPRS students) are obliged to attend the astronomy lab course ("Praktikum") and fulfill their teaching obligation (a minimum of one 'Deputat' corresponding to 2 hours/week for one semester; e.g. lecture tutorial / exercises supervision).

Please check the webpage of the university graduate school HGSFP for more information about the university rules for graduate students. A summary of rules defined by the Dean of the Faculty for Physics and Astronomy can be downloaded as pdf file (<http://www.mpia.de/imprs-hd/index.html>).

•**Cosmology:** Models and properties of the homogeneous universe, inhomogeneities in the universe, early universe, inflation and dark energy, later stages of the universe, galaxy distribution, gas, galaxy clusters

Specialized courses:

There are several courses per semester focused on various research topics within the IMPRS research field. We expect IMPRS students to join at least one of these courses.

IMPRS seminars:

The weekly IMPRS seminar is intended to provide a central meeting opportunity for all IMPRS students in order to exchange ideas and experience.

In winter term, the IMPRS seminar is held as a "Oberseminar", i.e. as literature seminar discussing current research highlights as well as fundamental knowledge from recent astrophysics literature.

In summer term, the IMPRS seminar is held as an advanced seminar ("Fortgeschrittenenseminar") with presentations of ongoing thesis projects.

IMPRS summer schools:

Annual summer schools on dedicated fields will take in Heidelberg with lectures and seminars by invited lecturers and guest scientists. We aim for topics which are of interest for a broad audience of IMPRS students.

Astronomical Colloquium:

Students are expected to attend the weekly astronomical colloquium.

