

Agreement on an ERASMUS MUNDUS Joint Masters Programme in Astrophysics

between

University of Padua
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35122 Padova
Italy

and

University of Rome "Tor Vergata"
via della Ricerca Scientifica 1
00133 Roma
Italy

and

University of Göttingen
Wilhelmsplatz 1
37073 Göttingen
Germany

and

University of Belgrade
Studentski trg 1
11000 Belgrade
Serbia

and

University of Innsbruck
Innrain 52 / Christoph-Probst-Platz
6020 Innsbruck
Austria



In order to develop further international opportunities for students from the University of Padua, the University of Rome "Tor Vergata", the University of Göttingen, the University of Belgrade, the University of Innsbruck, and in order to strengthen the international ties between the institutions, the University of Padua, the University of Rome "Tor Vergata", the University of Göttingen, the University of Belgrade and the University of Innsbruck (coordinating institution) have decided to enter into this Agreement for the establishment of an ERASMUS MUNDUS Joint Masters Programme in "Astrophysics" (AstroMundus). The framework of this agreement is defined by the Framework Agreement 2010-0135/001 with the EU (thereafter called FPA) and its Annex I containing the original application with the letters of intent by the rectors/presidents of the involved universities (thereafter called proposal) and its Annex III containing the Erasmus Mundus Program Guide (thereafter EMPG) published under call EAC/04/2009¹.

1. Objectives

AstroMundus is a two-year ERASMUS MUNDUS Masters Course in Astronomy and Astrophysics. The main objectives of the programme are initiation in scientific research and applied training in Astronomy and Astrophysics. Emphasis is placed on the application of modern techniques both in the observational and theoretical/computational domain. The various specialities of the partner institutions result in an increased offer of pathways to the students. Theoretical Astrophysics, Models, Simulations and Computation, as well as Observational Astrophysics based on data from the ground and from space and on the use of modern data archives.

This Agreement offers students of the University of Padua, the University of Rome "Tor Vergata", the University of Göttingen, the University of Belgrade and the University of Innsbruck, upon the successful fulfilment of the conditions outlined in this Agreement, the opportunity of receiving a Master degree by means of a joint diploma. On behalf of all institutions, where the student achieved the necessary amount of mobility periods², this diploma will be issued by the very institution, where the master thesis defence is approved. This official diploma has to be in English and if required by national law of the issuing institution also in the national language, and has to contain the programme name, and the names of all the institutions on whose behalf the diploma is issued, and has to contain the names of the national degrees.

2. Candidates for the Joint Masters Programme

Students registered as degree candidates at the University of Padua, the University of Rome Tor "Vergata", the University of Göttingen, the University of Belgrade and the University of Innsbruck and other recognized European and international universities shall have access to the Joint Masters Programme.

¹ http://eacea.ec.europa.eu/erasmus_mundus/programme/programme_guide_en.php

² For the definition of the required mobility periods see section "

7. Conditions for obtaining the Joint Masters Degree"



As a minimum requirement for eligibility, the students must have a Bachelor degree in one of the following fields: Physics, Astronomy, Astrophysics, Mathematics or an equivalent qualification (e. g. a recognised equivalent level of learning in the same fields, quantified as three years of studies corresponding to 180 ECTS).

Students shall be screened for eligibility for admission as Joint Masters Candidates by the coordinating institution (in collaboration with the selection committee that contain according to the FPA one representative of each partner institution). The coordinating institution shall respect the admission requirements and enrolment constraints of the partner institutions.

Joint Masters Candidates shall be nominated by the coordinating institution. This nomination shall replace the evidence of university entrance qualification and the legalization.

Joint Masters Candidates shall be subject to the standard rules, regulations and enrolment constraints of the coordinating institution. They shall, in terms of registration procedure, be granted all privileges for candidates of "mobility programs". Tuition fees shall, on the basis of reciprocity, be waived during that period of the study program which will be carried out at the host institution. Due to national Serbian law the candidates, to be able to obtain a degree in Belgrade, have to be enrolled throughout the whole period.

3. Overview / Duration

The programme lasts for two years (120 ECTS).

During the first semester the students attend courses at the entrance university (University of Innsbruck).

The first semester is focused on basic learning in Astronomy and Astrophysics while the subsequent ones offer the students the possibility to specialise in different branches.

The second semester is spent at one of the two Italian partner universities. The third semester is spent at one of the three partner institutions in Rome, Göttingen, or Belgrade depending on the astrophysical branches which the student will select to specialize on.

Finally the fourth semester is mainly devoted to the Master Thesis (30 ECTS) that can be accomplished in any of the partner institutions. Students are given the opportunity of attending additional advanced courses/seminars during the fourth semester, especially on topics related to their thesis work.

4. Curriculum

The curriculum shall be organized according to the FPA and to the ERASMUS MUNDUS proposal for a Joint Masters Programme in Astrophysics. Each partner is responsible to install the required local curricula according to national regulations and publicly publish it at latest three months before enrolment of the first students^{3,4}.

³

See EMPG section 4.2.2

⁴

Or earlier if it is required due to national legislation to be in force during the academic year 2010/11



A provisional scheme of lectures is enclosed in Appendix 1.

5. Examinations and Theses

Courses/Modules and examinations shall be organized by and according to the legal provisions and procedures of the university where they are taken.

Selection of the examiners is made by the appropriate academic authorities and in accordance with the examination procedures of the home and the host institution.

If possible, Master theses can be supervised jointly. For that reason, the Joint Masters candidates shall choose one main supervisor from one institution, and shall be allocated a second supervisor from one of the other institutions.

6. Usage of ECTS

ECTS is used as the model of recognition and accounting of the students' workload. The students are initially enrolled at the University of Innsbruck. They can enrol for the whole EM-AM program at the University of Innsbruck. When moving to another university, they are, if not otherwise defined in Section 2, considered as students from the University of Innsbruck.

Each visited university will fully recognise and validate the whole student's achievements within this Master Programme according to the curriculum defined in Section 4. In the case of a student passing through both Italian universities it is agreed that only the last one of the Italian universities to be visited will be contained in the awarded joint EM-AM degree⁵.

7. Conditions for obtaining the Joint Masters Degree

Students who complete the requirements of the programme successfully will be awarded a joint Masters degree by the consortium universities where they accomplished the various parts of their Masters studies.

The Joint Masters Degree (Master of Science /MSc) shall only be awarded for those universities where the student has completed his/her studies, and has additionally fulfilled the following requirements:

- a. award of at least 30 ECTS credit points (or 15 ECTS credit points for Belgrade) under the responsibility of each institution awarding the degree within the EU;⁶ and
- b. successful completion of a master thesis

⁵ By an Italian law a student can not be enrolled at the same time at two different Italian universities.

⁶ Minimum requirement due to
EMPG section 4.2.2 for the EU; and
UG2002 §87 (5) for Austria;



8. Program Coordination

Each institution will nominate a program coordinator to ensure that the Joint Masters Programme proceeds according to a reasonable schematic plan, and that the terms of this Agreement are carried out. Each institution may name a substitute representative of its coordinator. Each programme coordinator will ensure that the partner institutions have all the information appropriate to the promotion of the program.

In the early stage the following professors have agreed to serve as academic coordinators:

Prof. Luigi Secco, University of Padua

Prof. Roberto Buonanno, University of Rome "Tor Vergata"

Prof. Wolfram Kollatschny, University of Göttingen

Prof. Dragana Ilic, University of Belgrade

Prof. Sabine Schindler, University of Innsbruck (coordinator)



9. Duration, Amendment, Review and Termination of Agreement

This Agreement shall be in force as of the date of its signature by all partners and be binding for the parties for a period of five generations of EMMC students (six years). It shall be subject to revision, modification or renewal by mutual written agreement.

The Agreement may be terminated at the request of each institution, provided such request is made in writing at least twelve months before termination is to become effective. Any termination of the Agreement must take into account the rights of students already participating or accepted for any exchange to complete the parts of the study program which will be carried out under the responsibility of the coordinating institution.

An evaluation of this Agreement will be initiated by the institutions at least twelve months prior to the date of expiration to ascertain whether the programme should be continued and, if so, how it might be improved.

In witness thereof this Agreement has been signed by the proper officers of each institution.

University of Padua
Prof. Luigi Filippo Donà dalle Rose
Delegate of the Rector



Padova, 14th January 2010

University of Rome "Tor Vergata"
Prof. Renato Lauro
Rector



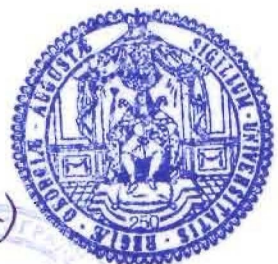
Rome, 15 GEN. 2010



University of Göttingen
Prof. Kurt von Figura
President



20.01.2010 (Göttingen)



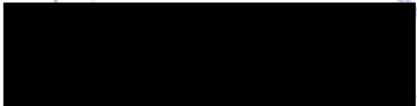
University of Belgrade
Prof. Branko Kovacevic
Rector



612-793/7-10



University of Innsbruck
Karlheinz Töchterle
Rector



18.1.2010



Appendix 1. Scheme of Lectures

First Semester (only offered at Innsbruck)

Innsbruck		
S1	ECTS	Type
Concepts of Galactic Astrophysics	6.5	compulsory
Concepts of Extragalactic Astrophysics	6.5	compulsory
Concepts of Physics for Astrophysicists	6	compulsory
Advanced Mathematical Methods for Astrophysicists	6	compulsory
Basic Concepts of Quantum Physics	5	optional
Basic Concepts of Ion, Plasma and Applied Physics	5	optional
Basic Concepts of Astro and Particle Physics	5	optional
Relativity	5	optional
Theory of Gravitational Lenses	2	optional
Variable Stars	2.5	optional
Introduction to Radio-astronomy	1.5	optional
Recent Results of Galactic Research	1.5	optional
German as a foreign language	5	optional

Second Semester (S2) offered at Padua and Rome

Padua		
S2	ECTS	Type
Astronomical Spectroscopy	5	compulsory
Theoretical Astrophysics	5	compulsory
Cosmology	5	compulsory
Galaxy Dynamics	5	compulsory
High Energy Astrophysics	4	optional
Astrophysics of Galaxies	5	optional
Astrophysics of Interactions	5	optional
Formation of Cosmic Structures	5	optional
Astrophysics of Interstellar Medium	5	optional
Theoretical Astrophysics: Collapsed Stars	5	optional
Space Plasma Physics	5	optional
Celestial Mechanics	5	optional
Stellar Populations	5	optional
Italian as a Foreign Language	3	optional

Rome		
S2	ECTS	Type
Observational Solar Physics	6	compulsory
Stellar Astrophysics	6	compulsory
Extragalactic Astrophysics 1	6	compulsory
Relativity and Cosmology 1	6	compulsory
Choice of courses and activities for 6 ECTS among those listed in table WP below	6	compulsory
Italian as a foreign language	3	optional



Third Semester (S3) offered at Rome, Göttingen and Belgrade

Rome			
S3	ECTS	Type	
Relativity and Cosmology 2	6	compulsory	
Physics of Gravitation	6	compulsory	
Choice of courses and activities for 18 ECTS among those listed in annex table WP	18	compulsory	
Italian as a foreign language	3	optional	

Rome: Annex Table WP (applies for S2 and S3)			
Radiative Processes in Astrophysics (S3)	6	optional	
Astrophysics Laboratory (S3)	6	optional	
Astronomical Archives (S2)	6	optional	
High Energy Astrophysics (S3)	6	optional	
Extragalactic Astrophysics 2 (S2)	6	optional	
Astrophysics of Galaxies (S3)	6	optional	
Theoretical Solar Astrophysics (S2)	6	optional	
Space Physics (S2)	6	optional	
Celestial Mechanics (S3)	6	optional	
Gravitational Waves (S3)	6	optional	
Planetology (S3)	6	optional	
Astrobiology (S3)	6	optional	
Stage (S2 or S3)	6	optional	

Göttingen			
S3	ECTS	Type	
Active Galactic Nuclei	5	compulsory	
Stellar Structure and Evolution	5	compulsory	
Stellar Atmospheres	5	compulsory	
Physics of the Sun, Heliosphere and Space Weather	5	compulsory	
Introduction to Solar System Physics	4	optional	
Cosmology	4	optional	
Scientific Computing for High Energy Physics	4	optional	

Belgrade			
S3	ECTS	Type	
Spectroscopy of Astrophysical Plasmas	6	compulsory	
Physics of Gaseous Nebulae and Active Galactic Nuclei	6	compulsory	
Physics of Interstellar Matter	5	optional	
Astrobiology	4	optional	
Line Shapes in Astrophysics	4	optional	
Introduction to Nucleosynthesis and Particle Astrophysics	5	optional	
Numerical Astrophysics - Modelling Stellar Atmospheres	5	optional	
Gravitational Lenses	4	optional	
Supernovae and Their Remnants	4	optional	
Serbian as a Foreign Language	5	optional	



Fourth Semester (S4) offered at Innsbruck, Padua, Rome, Göttingen and Belgrade

Innsbruck			
S4	ECTS	Type	
Master Thesis	27.5	compulsory	
Thesis Presentation	2.5	compulsory	
Astrophysics Seminar	2.5	optional	
High Performance Computing Seminar	1	optional	
Seminar on Galaxy Clusters	2.5	optional	
Computational Methods in Physics and Astrophysics	5	optional	
Statistic and Detectors	2.5	optional	
Solar and Stellar Physics	2.5	optional	
Astroparticle Physics	2.5	optional	
Physics of Galaxy Clusters	2	optional	
German as a Foreign Language	5	optional	
German as a Foreign Language - Conversation	2	optional	

Padua			
S4	ECTS	Type	
Master Thesis + Presentation	30	compulsory	
Italian as a Foreign Language	3	optional	

Rome			
S4	ECTS	Type	
Master Thesis + Presentation	30	compulsory	

Göttingen			
S4	ECTS	Type	
Master Thesis + Presentation	30	compulsory	
Astrophysics Seminar	2.5	optional	

Belgrade			
S4	ECTS	Type	
Master Thesis + presentation	30	compulsory	

