

**SYLLABUS**

**STUDY YEAR 2015/2016**

# **Master Programme in Space Science and Technology**

## **Enrollment semester Autumn 2015**

**DATE**

**2015-03-31**

**DECISION MAKER**

**Enhetschefen Utbildnings- och forskningsenheten**

## Programme content and structure

In order to be eligible for the diploma in Master of Science in Space Technology with specialisations in Atmospheric and Space Sciences, Space Technology and Instrumentation the student has to obtain 120 ECTS, including courses on the advanced level for at least 90 ECTS and a Master thesis for 30 ECTS. The program is based on the Erasmus Mundus cooperation between six European and two Third-Country partner universities and combines courses in space science and technology. The program is coordinated by Luleå University of Technology.

Erasmus Mundus is an EU program that supports cooperation and exchange between universities on Master and postgraduate levels and provides European education of the highest quality.

European partner universities:

Luleå University of Technology (LTU) Sverige  
 Julius-Maximilians Universität Würzburg (JMUW) Tyskland  
 Cranfield University (CU) Storbritannien  
 Aalto University School of Science and Technology (AALTO) Finland  
 Czech Technical University Prague (CTU) Tjeckien  
 Université Paul Sabatier Toulouse (UPS) Frankrike

Third-country partner universities:

The University of Tokyo, Japan  
 Utah State University, USA

The first compulsory semester takes place at Julius-Maximilians University, Würzburg, Germany. The second compulsory semester takes place at Luleå University of Technology, Sweden. During the second semester students choose a European partner university for the second study year on the basis of their specialization. For students who take the second year at Luleå University of Technology a possibility to combine courses from two specialisations, i.e. in Space and Atmospheric Science and Space Technology and Instrumentation, is offered. The program concludes with a Master thesis in the chosen specialization at one of the partner universities.

For admission to the degree project course entry requirements specified in the Course Syllabus must be completed. Information regarding the application- and admission process is given and ensured by the responsible department.

Specialisations offered:

- Space Technology and Instrumentation (LTU)
- Atmospheric and Space Science (LTU)
  
- Automation, Control and Communication of Space Robotics (JMUW)
- Dynamics and Control of Systems and Structures (CU)
- Space Robotics and Automation (Aalto)
- Space Automation and Control (CTU)
- Space Technique and Instrumentation (UPS)
- Astrophysics, Space Science and Planetology (UPS)

All students within the educational program will be admitted to Master thesis course at LTU. All students that meet the requirements for graduation will receive Master of Science with a Major in Space Technology. Specializations given at LTU are included in the diploma.

Courses and diploma requirements for specialisations at the partner universities can be found at the respective universities or the programme website <http://www.spacemaster.eu/>.

Swedish for beginners is offered for overseas students. The course is not included in the degree, and is read in addition to the obligatory courses.

## Credits

120 credits

## Degree

- Degree of Master of Science (120 credits) - Major; Space Technology

## Specialisations

### Specialisation

- Atmospheric and Space Science, research oriented (RYSP)
- Space Technology and Instrumentation (RYIN)

### Profile

- Specialisation offered at partner universities

## Entry requirements

Successful completion of a basic engineering program or a Bachelor's degree with a minimum of 180 ECTS in the areas of physics, space physics, astronomy, engineering, electronics, mechatronics, space technology, computer science or equivalent. A minimum of 22.5 ECTS in mathematics at the university level is required. Applicants with earlier studies in Sweden must hold a "Kandidatexamen" in a relevant field or if the applicant is enrolled in European Diploma engineering programmes, or the equivalent, he/she must have completed at least three years of his/her studies.

Documented skills in English language.

## Selection

The selection procedure is based on academic qualifications, quality and quantity aspects

### Selection group

Academic: 100%

## Compulsory courses

### Compulsory courses 90 credits

Course code	Course	Cr	Level	Comment
E7003R	Electronics in Space	7.5	Master's level	
F7003R	Optics- and Radar-based Observations	7.5	Master's level	
P7004R	Master Degree Project	30	Master's level	
R7004R	Spacecraft Environment Interactions	7.5	Master's level	
R7017R	Space Physics	7.5	Master's level	
	Space Dynamics.(Second cycle)	5		
	CanSat (Second cycle)	9		
	Introduction to Space Physics (Second cycle)	8		
	Spacecraft System Design (First cycle)	8		

### Course offered outside the obligatory courses - not compulsory - For non Scandinavian students

Course code	Course	Cr	Level	Comment
S0046P	Swedish for International Students 1	3	Bachelor's level	Selectable

## Specialisation: Atmospheric and Space Science, research oriented (RYSP)

### Compulsory course 7.5 credits

Course code	Course	Cr	Level	Comment
R7013R	Space Instruments	7.5	Master's level	

### Selective courses 22.5 credits

Selective space is 22.5 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
F7001R	Space Plasma Physics	7.5	Master's level	Selectable
F7004R	Atmospheric Physics	7.5	Master's level	Selectable

Course code	Course	Cr	Level	Comment
F7007R	Cosmology	7.5	Master's level	Selectable
F7008R	The Solar System	7.5	Master's level	Selectable
P7006R	Space Engineering Project 2	7.5	Master's level	Selectable
R7011R	Image Processing with Space Applications	7.5	Master's level	Selectable
R7012R	Remote Sensing	7.5	Master's level	Selectable
R7018R	Spacecraft on board datahandling	7.5	Master's level	Selectable
R7020R	Spacecraft Design	7.5	Master's level	Selectable

## Specialisation: Space Technology and Instrumentation (RYIN)

### Compulsory courses 15 credits

Course code	Course	Cr	Level	Comment
R7013R	Space Instruments	7.5	Master's level	
R7020R	Spacecraft Design	7.5	Master's level	

### Selective courses 15 credits

Selective space is 15 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
F7008R	The Solar System	7.5	Master's level	Selectable
P7001R	Space Engineering Project II	15	Master's level	Selectable
P7006R	Space Engineering Project 2	7.5	Master's level	Selectable
P7011R	Spacecraft Instrument Project	15	Master's level	Selectable
P7012R	Spacecraft Design Project	7.5	Master's level	Selectable
R7015R	Space flight orbit dynamics	7.5	Master's level	Selectable
R7016R	Space flight attitude dynamics	7.5	Master's level	Selectable
R7018R	Spacecraft on board datahandling	7.5	Master's level	Selectable