

The Erasmus Mundus programme in the field of higher education promotes the European Union as a centre of excellence in learning around the world and supports the European top-quality Masters Courses.

# European Space Master-students to Kiruna

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*In the first picture students are being given lessons within the theme of electronic in space, how the space environment provides risk for damages of the electronic equipment*

*In the second picture the same students test the theory in the laboratory. Practice makes perfect.  
Photo credit:  
Luleå University of Technology.*

The first group of students, enrolled at the newly established Space Master education in Kiruna, northern Sweden, is now well under way in their second term.

The students have completed their first term at the Julius-Maximilian's University, Würzburg, Germany, and will continue this period of six months in Sweden. The class is very international with fifty students from twenty-two countries represented, where two are from Sweden and one is from Finland.

This term all students will continue the education at Luleå University of Technology and Umeå University, the Kiruna Space Campus. The

education, mainly containing general space related modules, is carried out in close cooperation with the space related institutions in the Kiruna area, Institute of Space Physics, EISCAT Scientific Association and Swedish Space Corporation at the Esrange launching base. During the spring the students will be given possibilities to participate in the launch of a student balloon and a student sounding rocket from Esrange. Both campaigns are based on student works within the education institutions at Kiruna.

After this semester, an estimated number of ten students will continue the second year of specialising and higher examinations.

Space Master – Joint European Master in Space Science and Technology – was accepted last year by the EU commission as an Erasmus Mundus Master Course and is carried out in cooperation between six European universities, where institutions in Sweden and Finland are included. Luleå Technological University is the coordinating institution within the consortium. The universities have different profiles but together they will give technical competence in areas as robotic, automatic, space control and instrumentation together with scientific competence within areas such as space-, atmosphere-, and astrophysics, and planetology. The vision and ultimate goal is to unite the different fields to a common platform for space competence within the framework for the new European concept for higher education, the Bologna process.

Asta Pellinen-Wannberg, the coordinator for the Space Master-programme, looks forward towards an exciting period together with the students. The quick start of this education based on the Bologna declaration provides good possibilities to promote Kiruna as a unique place for such an education, she says. This is based on closeness to possibilities for activities such as field measurements with balloons; sounding rockets and radars, in addition to satellite communication and similar activities via the space related actors localized close by the institution.



## Erasmus Mundus

### – a link in the European knowledge building systems

The Erasmus Mundus programme is a co-operation and mobility programme in the field of higher education which promotes the European Union as a centre of excellence in learning around the world. It supports European top-quality Masters Courses and enhances the visibility and attractiveness of European higher education in third world countries. It also provides EU-funded scholarships for third country nationals participating in these Masters Courses, as well as scholarships for EU-nationals studying in third world countries.

In July 2001, the European Parliament and Council received a Communication by the Commission on strengthening EU-third country co-operation in higher education. Following the positive reception of the Communication, the Commission adopted a programme proposal Erasmus World, in July 2002 and renamed it Erasmus Mundus. The legislative process involving the European Parliament and Council ended in 2003 and the Erasmus Mundus programme Decision was adopted, and entered into force on January 2004.

The programme confirms the Commission's desire to encourage the opening up of European higher education to the rest of the world and complements the European Union's existing regional programmes in higher education in third world countries. Regional programmes, such as Tempus, ALFA and Asia-Link, will continue to foster international co-operation with regards to higher education between the European Union and its partners.

Erasmus Mundus, however, is a new global scheme, providing a distinctly «European» offer in higher education. It seeks, primarily, to enhance the quality and attractiveness of European higher education world-wide. Secondly, Erasmus Mundus Masters Courses and scholarships will provide a framework to promote valuable exchange and dialogue between cultures. By supporting the international mobility of scholars and students, Erasmus Mundus intends to prepare its European and non-European participants for life in a global, knowledge-based society.

The programme is intended to strengthen European co-operation and international links in higher education by supporting high-quality European Masters Courses, by enabling students and visiting scholars from around the world to engage in postgraduate studies at European universities, as well as by encouraging the outgoing mobility of European students and scholars towards third world countries.

In concrete terms, Erasmus Mundus will support about 100 Erasmus Mundus Masters Courses of outstanding academic quality. It will provide grants for some 5,000 graduate students from third world countries to follow these Masters Courses, and for more than 4,000 EU graduate students involved in these courses to study in third world countries.

## Education in robot technique at Helsinki University

The next step for students who choose space robotic can enrol as a third semester at the Automation Technology Laboratory at Helsinki University of Technology. TKK Automation Technology Laboratory will provide an education in technologies used for robotic exploration of planets' surface. The topics include robotics, mobility, locomotion technology, sensing, navigation, autonomy and novel utilization of nature-inspired technology and behaviour.

The available hardware in the laboratory consists of systems that have been developed in co-operation with European Space Agency. These include a tracked roving vehicle for a planetary drill, a spherical mobile robot for Mars surface exploration and a drilling test rig that is being used to develop technologies for Mars sub-surface exploration. This equipment is to be used to build, implement test and analyze control and communication technologies as well as for mechanical improvements. In addition several mobile robots for terrestrial use are available for development and experiments. These include a centaur-like legged and wheeled Work Partner robot and a ball-shaped home-helper robot.



*Working with different types of robots at Helsinki University of Technology.  
Photo: TKK Automation Technology Laboratory*

## The Space Master course

The objective of this new Joint European Master in Space Science and Technology is to combine the great diversity of space expertise at six European universities to a common platform of competence within the guidelines of the Bologna process. Good quality European and third-world country students will in the framework of Space Master have the possibility to study space science at excellent universities in Europe in a research-oriented environment.

The participating institutions in the course are:  
Cranfield University, UK  
Czech Technical University, Czech Republic  
Helsinki University of Technology, Finland  
Julius-Maximilians Universität Würzburg, Germany  
Luleå University of Technology, Department of Space Science  
Université Paul Sabatier Toulouse III, France

The Department of Space Sciences at Luleå University of Technology organizes the education in collaboration with the Umeå University, the Swedish Institute of Space Physics (IRF), EISCAT Scientific Association and the Swedish Space Corporation (SSC) Esrange Launch Site.

The students will get cross-disciplinary extension from concrete situations such as balloon, rocket, satellite and radar control, telex robotics, sensor data fusion, automatic control and multi-body dynamics.

It's a four semesters Master Course. The first year is the same for all students.

Semester 1: Introductory space related modules at JMUW  
Semester 2: Space related modules at Kiruna Space Campus/Sweden  
Semester 3: Engineering/Science specialisation related to local expertise  
Semester 4: Masters Thesis administrated by academics from minimum two universities.

The second year (Semester 3-4) is divided in five engineering and three scientific tracks following the competence of the partners:

- Structural Dynamics and Control at CU
- Space Automation and Control at CTU
- Space robotics at JMUW or HUT
- Space Technology and Instrumentation at Kiruna Space Campus
- Space, Atmospheric and Solar physics at Kiruna Space Campus
- Space phys., Astrophys., Planetology, Spatial techniques and instrumentation at UPS



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