COURSE OUTLINE

(1) GENERAL

SCHOOL	Economy, Management and Informatics		
ACADEMIC UNIT	Department of Informatics and Telecommunications		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE		**SEMESTER**	C
COURSE TITLE	**Advanced Space applications**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Courses		
Practical exercises		
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background & Skills development
PREREQUISITE COURSES:	Fundamentals of Remote Sensing Space Applications I Signal/Image Processing and Pattern Recognition
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	TBA

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(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Advanced courses on methodological approaches, models, and processing chains/specialised Sw packages to address developing needs of specific downstream applications in the five applications domains (Climate, Land, Ocean, Atmosphere, Disaster Risk Reduction and Security).
Upon successful completion of the course, students will be able to:
- Develop downstream applications in one of the application domains;
- Choose the right satellite data for a specific application;
- Assess the advantages and shortcomings of using satellite technology for specific applications;
- Design a monitoring solution for an environmental or disaster scenario.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Adapting to new situations.
- Working independently
- Working in an interdisciplinary environment
- Decision-making.

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(3) SYLLABUS

Land space applications
Space derived land parameters, spectral indices, landscape/ecosystem elements derivation and use in land use/land cover, forestry, agriculture, biodiversity, mineral/geological mapping, urban mapping, waste management, and vegetation monitoring applications.

Climate space applications
Climate related indices from space, space monitoring of radiatively acting gases, monitoring and mapping of global scale events (e.g. dust outbreaks, volcanic eruptions), space derived climatologies of essential environmental/climate parameters, synergies with ground based observational platforms and modeling, extreme weather events (e.g. heatwaves).

Atmosphere space applications
Application in Atmosphere of: passive sensors, lidar/radar active sensors and Doppler technologies in atmospheric science; Ground-based remote sensors for the calibration and validation of satellite missions

Marine space applications
Review of the different remote-sensing platforms available for studying the ocean, basic ocean dynamics and bio-optical properties in the sea, basics for applications of altimetry, wind scatterometry and sea-surface temperature to the study of ocean circulation and air-sea interactions, and ocean colour to the estimation of primary production.

Disaster Risk Reduction and Security space applications
Hazard, vulnerability and risk assessment with geo-spatial and remote sensing techniques, disaster monitoring: satellite image processing techniques for hazard real-near real time monitoring, remote sensing in identification of the extent and magnitude of the hazard, early warning systems and information networks, disaster impact analysis with RS, integrated approaches using Remote Sensing, navigation, and telecom, inclusion of citizen observatories.

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(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	- Laboratory education - Communication with students

TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	***Activity Semester workload*** 15 Lectures 24 Project 71 Interactive Teaching 90 Studying 200 Course total
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final examination (~30%) consisting of - Open-ended questions. - Laboratory work Project examination and presentation (~70%) consisting of - Report - Oral examination, public presentation

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(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

Books:

1. Campbell, James B., and Randolph H. Wynne. 2011. Introduction to Remote Sensing. 5th ed. New York: The Guilford Press.
2. K. N. Liou. 2002. An Introduction to Atmospheric Radiation. 2nd ed. International Geophysics Series, Vol. 84.
3. R. A. Schowengerdt, Remote Sensing: Models and Methods for Image Processing, 3rd ed. London, UK: Academic Press, 2006, p. 560.
1. C. Elachi and J. J. van Zyl, Introduction to the Physics and Techniques of Remote Sensing, 2nd ed. Hoboken, New Jersey: Wiley-Interscience, 2006, p. 616.
2. P.S. Thenkabail, J.G. Lyon, and Huete, A., Hyperspectral Remote Sensing of Vegetation, CRC Press Taylor & Francis Group, 2012, p. 705.

Journals:

1. Remote Sensing of Environment, Elsevier
2. Atmospheric Measurement Techniques, Copernicus
3. ISPRS Journal of Photogrammetry and Remote Sensing
4. IEEE Transactions on Geoscience and Remote Sensing
5. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
6. IEEE Geoscience and Remote Sensing Letters
7. International Journal of Geographical Information Science, Taylor & Francis
8. International Journal of Remote Sensing, Taylor & Francis

9. Remote Sensing, MDPI

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