COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	MRE705	SEMESTER	7
COURSE TITLE	REMOTE SENSING – GEOGRAPHICAL INFORMATION SYSTEMS		

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
LECTURES	2	2
LABORATORY EXERCISES	2	2
TOTAL	4	4
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
PREREQUISITE COURSES:	Geodesy (MRE404)
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uowm.gr/courses/MRE156/

(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*

The course aims to enable students to:

- Take advantage of the capabilities offered by Remote Sensing in the acquisition of spatial thematic information.
- Apply remote sensing image processing methodologies to extract information.
- Apply the techniques of Remote Sensing in mining exploration, mining project management, environmental management, and hydrocarbon exploration.
- Know the structures of digital spatial data.
- Know the principles of entering, managing, processing, analyzing and visualizing data using geographic information systems.
- Develop geographic information systems for the problem areas of the Mineral Resources Engineer
- Use remote sensing and geographic information systems commercial and open-source software packages available.

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
- Decision-making
- Working independently
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas
- Project planning and management
- Respect for the natural environment

(3) SYLLABUS

History and general principles of remote sensing, electromagnetic radiation and general remote sensing systems, photographic systems, photo interpretation, photogrammetry, remote sensing bodies and receivers, digital processing of remote sensing images, radiometric errors, geometrical deformations, atmospheric correction, image improvement, classification, remote sensing applications, software, geographic information, data models, axioms, geographic data in the computer, input, processing, storage and output data, georeference, geocoding, interference, digital terrain models, spatial analysis of discrete entities and continuous fields, database management, SQL query development, errors and controls, thematic maps, modern problems and trends in geographic information systems (GIS), GIS applications. Data sources, digitization, mosaic conversions to vector data, positioning systems. Laboratory exercises.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face lectures, distance seminars, laboratory exercises on the computer using special GIS software</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of a projection system, special GIS software installed on computer units of a special laboratory, organization and scheduling of the course and communication with students through the asynchronous e-learning platform open eclass.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>28</td></tr>
<tr><td>Laboratory exercises</td><td>28</td></tr>
<tr><td>Theory study</td><td>24</td></tr>
<tr><td>Lab exercises study</td><td>24</td></tr>
<tr><td>Seminars</td><td>16</td></tr>
<tr><td>Course total</td><td>120</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>Weekly examination of interactive laboratory exercises on the computer (40% of the total grade of the course), final written examination of theory (50% of the total grade of the course) and final written examination of laboratory exercises (10% of the total grade of the course).
The evaluation criteria are given on the relevant page of the course on the asynchronous e-learning platform open e-class and are analyzed to the students at the beginning of the semester.</td></tr>
</table>

(5) SUGGESTED BIBLIOGRAPHY

- Suggested bibliography:

Autodesk, Raster Design Getting Started Guide, Autodesk Inc, 2009, pages 122.

Burrough, P.A., and McDonell, R.A. Principles of Geographical Information Systems, Spatial Information Systems and Geostatistics, Oxford University Press, 1998.

Eastman, J.R., IDRISI Andes Guide to GIS and Image Processing, Clark Labs, 2006, pages 328.

ESRI, GIS for Emergency Management, White paper, Environmental Systems Research Institute Inc, 1999.

Gupta, R.P., 2003, Remote Sensing Geology, 2nd Edition, Springer-Verlag (Berlin), 655 pages

Ζήσου, Α., Εισαγωγή στα Συστήματα Γεωγραφικών Πληροφοριών ArcGIS/ArcView – Θεωρία & Εφαρμογές, Εκδόσεις Αθ. Σταμούλης, 2007, pages 269.

Καπαγερίδης, Ι., Εισαγωγή στη Γεωστατιστική, Εκδόσεις ΙΩΝ, 2006, pages 238.

Καπαγερίδης, Ι., Εισαγωγή στην Τηλεπισκόπηση και τα Γεωγραφικά Συστήματα Πληροφοριών – Σημειώσεις Θεωρίας και Εργαστηρίου, 2021, Πανεπιστήμιο Δυτικής Μακεδονίας, 205 pages

Καρτάλης, Κ., Φειδάς, Χ., Αρχές & Εφαρμογές Δορυφορικής Τηλεπισκόπησης, Β.Γκιούρδας Εκδοτική, 2006, pages 672.

Κουτσόπουλος, Κ., Ευελπίδου, Ν., Βασιλόπουλος, Α., Γεωγραφικά Συστήματα Πληροφοριών – Χρήση του MapInfo Professional, Εκδόσεις Παπασωτηρίου, 2006, pages 278.

Li, J., Zlatanova, S., Fabbri, A., Geomatics Solutions for Disaster Management, Lecture Notes in Geoinformation and Cartography, 3rd International Symposium on Geomatics Solutions for Disaster Management, Springer-Verlag, 2007, pages 444.

Lillesand, T.M., and Kiefer, R.W., Remote Sensing and Image Interpretation, Wiley, 1994

Linder, W., 2006, Digital Photogrametry – A Practical Course, 2nd Edition, Springer-Verlag (Berlin), 214 pages

Μερτίκας, Σ.Π., Τηλεπισκόπηση και Ψηφιακή Ανάλυση Εικόνας, Εκδόσεις ΙΩΝ, 1999, pages 499

- *Related academic journals:*

Applied Computing and Geosciences, Elsevier
Computers & Geosciences, Elsevier
International Journal of Geographical Information Science, Taylor and Francis
International Journal of Remote Sensing, Taylor and Francis
ISPRS Journal of Photogrammetry and Remote Sensing
Journal of Applied Remote Sensing, SPIE
Journal of Photogrammetry, Remote Sensing and Geoinformation Science, Springer
Journal of Spatial Science, Taylor and Francis
Remote Sensing of Environment, Elsevier
Remote Sensing, MDPI
Transactions in GIS, Wiley