

## ΔΠΥ821 – GEOGRAPHIC INFORMATION SYSTEMS IN NATURAL ENVIRONMENT

### 1. GENERAL

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| <b>SCHOOL</b>                                 | School of Technology  |                         |                 |
| <b>DEPARTMENT</b>                             | Department of Forestry, Wood Sciences, and Design   |                         |                 |
| <b>LEVEL</b>                                  | <i>Undergraduate</i>  |                         |                 |
| <b>CODE</b>                                   | <b>ΔΠΥ821</b>   | <b>STUDENT SEMESTER</b> | 8 <sup>th</sup> |
| <b>COURSE TITLE</b>                           | Geographic Information Systems in Natural Environment   |                         |                 |
| <b>ACTIVITIES</b>                             | <b>WEEKLY HRS</b>   | <b>ECTS</b>             |                 |
| Lectures and Laboratory Sessions              | 3   | 5                       |                 |
|   |   |                         |                 |
|   |   |                         |                 |
| <b>TYPE OF COURSE</b>                         | Scientific area   |                         |                 |
| <b>PREREQUISITES:</b>                         | None  |                         |                 |
| <b>LANGUAGE TEACHING AND EXAMINATION:</b>     | Greek   |                         |                 |
| <b>THE COURSE OFFERED TO STUDENTS ERASMUS</b> | No  |                         |                 |
| <b>WEBPAGES COURSE (URL)</b>                  | <a href="https://eclass.uth.gr/courses/FWSD_U_155/">https://eclass.uth.gr/courses/FWSD_U_155/</a> |                         |                 |

### 2. LEARNING OUTCOMES

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| <b>Learning Outcomes</b>  |
| <p>The aim of the course is to provide basic knowledge concerning Geographical Information Systems (GIS), information structuring in databases, spatial analysis methods that can be applied using GIS, development and management of a GIS, and the use of GIS for storing, classification, and protection of natural resources.</p> <p>At the end of the course students will be able to:</p> <ul style="list-style-type: none"> <li>• Know the basic concepts of Geographical Information Systems.</li> <li>• Understand the main natural resource mapping techniques</li> <li>• Design and implement a Geographical Information System</li> <li>• Know the main concepts and uses of geodatabases</li> <li>• Create and edit forest maps using Geographical Information Systems</li> <li>• Conduct spatial data analyses and take decisions based on their results</li> </ul> |
| <b>General Skills</b>   |
| <p>Upon successful completion of the course, the students will be able to develop and cultivate basic professional and social skills:</p> <ul style="list-style-type: none"> <li>• Search, analysis and synthesis of data and information, using the necessary technologies</li> <li>• Adaptation to new situations</li> <li>• Decision making</li> <li>• Autonomous work</li> <li>• Teamwork</li> </ul>  |

- Demonstration of social, professional and moral responsibility and sensitivity to gender issues
- Exercise criticism and self-criticism
- Promoting free, creative and inductive thinking

### 3. COURSE CONTENT

In the theoretic part the following topics are described:

Historical overview. Cartography principles. Introduction to GIS and spatial analysis. Classification and mapping of natural resources. Basic concepts and advantages of GIS. GIS applications in Forestry. Geographical data and data base construction. GIS procedures in problem solving. Spatial analysis methods. Cartographic performance. Digital terrain models. Global positioning systems (GPS) and their contribution to GIS. Geographical Information Systems in the Internet (WebGIS).

The laboratory part is taught 1 hour every week and focuses on practical application of the theoretic concepts through targeted exercises, group sessions and targeted assignments. It covers the following topics:

Open and closed source GIS software. Introduction to ArcGIS software. Creation and organisation of spatial data in a geographical data base. Data digitisation and storage in geographical databases. Applications of projection system definition, georeferencing, analog map digitization, and special analyses using spatial queries. Operations between thematic layers and proximity analyses, cartosynthesis, and digital terrain model (DTM) creation. GIS applications in Forestry and solving forest management decision making problems using criteria in thematic layers.

The final semester assignment requires submission of the assignment materials as well as a 10 minute oral presentation at week 12. The semester assignment counts for 20% of the total course assessment and the remaining 80% is obtained through written examination.

### 4. TEACHING AND LEARNING METHODS - EVALUATION

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| <b>DELIVERY METHOD</b>                                   | Face to face   |                          |
| <b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES</b> | Use of a course website on the e-class platform for posting (a) notes, (b) internet links, (c) announcements, search tools and social networks<br><br>Furthermore, use of equipment such as as video projector, interactive board, and use of server and terminal stations at the laboratory room. |                          |
| <b>TEACHING ORGANISATION</b>                             | <b>Activity</b>  | <b>Semester Workload</b> |
|  | Interactive Teaching – Lectures  | 26                       |
|  | Laboratory exercises   | 13                       |
|  | Semester assignments   | 36                       |
|  | Self-study   | 50                       |
|  | <b>Course Total</b>  | <b>125</b>               |
| <b>STUDENT EVALUATION</b>                                | Both intermediate and final evaluation is applied.<br><br>The evaluation of the theoretical part is carried out by:<br><br>1. Optional intermediate written examination  |                          |

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|  | <ol style="list-style-type: none"><li>2. Semester assignment</li><li>3. Final written exam</li></ol> <p>The evaluation of the laboratory part is carried out by:</p> <ol style="list-style-type: none"><li>1. Two short written exams on 4<sup>th</sup> and 8<sup>th</sup> semester week which involve multiple choice questions</li><li>2. Laboratory assignments delivered on a weekly basis</li><li>3. Final exam carried out on week 14</li></ol> |
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## 5. RECOMMENDED-BIBLIOGRAPHY

- *Recommended literature:*

- Κουτσόπουλος Κ. 2017. Γεωγραφικά Συστήματα Πληροφοριών και Ανάλυση Χώρου. Σελ. 512, Θεσσαλονίκη, Εκδόσεις Δίσιγμα. [Κωδικός Βιβλίου στον Εύδοξο: 77111885]. (in Greek)
- Τσουχλαράκη Α., Γ. Αχιλλέως και Ν. Κουργιαλάς . 2019. Μαθαίνοντας τα GIS στην πράξη. Σελ. 672, Θεσσαλονίκη, Εκδόσεις Δίσιγμα. [Κωδικός Βιβλίου στον Εύδοξο: 86192352]. (in Greek)
- Κουτσόπουλος Κ. και Ν. Ανδρουλακάκης. 2005. Εφαρμογές Λογισμικού ArcGIS 9x με Απλά Λόγια. Σελ. 505, Αθήνα, Εκδόσεις Παπασωτηρίου. (in Greek)
- Ζήσου Α. Κ. 2007. Εισαγωγή στα Συστήματα Γεωγραφικών Πληροφοριών ArcGIS/ArcView, Θεωρία και εφαρμογές. Σελ. 272, Αθήνα, Εκδόσεις Αθ. Σταμούλης. (in Greek)