**COURSE OUTLINE**

1. **GENERAL**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SCHOOL** | SCHOOL OF ENGINEERING | | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF CIVIL ENGINEERING | | | | |
|  | UNIVERSITY OF PATRAS | | | | |
| **POSTGRADUATE PROGRAM: TITLE** | Master’s Degree "Design of Resilient, Sustainable and Intelligent Infrastructures".  Tracks:  (A) Resilient Materials, Structures and Geotechnical Infrastructures,  (B) Hydraulic and Environmental Engineering for Sustainable Infrastructures, and  (C) Intelligent Systems in Transportation and Construction Project Management | | | | |
| **LEVEL OF STUDIES** | POSTGRADUATE PROGRAM | | | | |
| **COURSE CODE** |  | **SEMESTER** | | SPRING (B’) | |
| **COURSE TITLE** | STATISTICAL DATA ANALYSIS | | | | |
| **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 | | | 3 | | 7.5 |
|  | | |  | |  |
| *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* | Specialised general knowledge, Skills development | | | | |
| **PREREQUISITE COURSES:** | NO | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | | | |
| **COURSE WEBSITE (URL)** | https://eclass.upatras.gr/courses/CIV1764/ | | | | |

1. **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 describes basic techniques for checking the randomness of samples, the existence of extreme values ​​and their goodness of fit to a theoretical model. Next, the most important parametric and non-parametric hypothesis testing are presented. Regression models (single, multiple, accounting), time series models and statistical control of processes. are also presented. Finally, the above techniques are illustrated through real applications using statistical programs (R, SPSS, Minitab), giving particular emphasis on understanding and interpreting the results. | |
| **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 * Team work * Working in an interdisciplinary environment * Production of free, creative and inductive thinking | |

1. **SYLLABUS**

|  |
| --- |
| * Test of randomness, * Detecting outliers * Goodness of fit tests * Hypothesis testing and confidence interval * Regression models * Generalized regression models * Time series models * Statistical process control |

1. **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* | Use of ICT in teaching  laboratory education (R, SPSS, MINITAB etc)  E-class |
| **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*** | | Lectures | 39 | |  |  | | study | 100 | | essay writing | 45 | |  |  | | exams | 3,5 | |  |  | |  |  | |  |  | | **Course total** | 187,5 | |
| **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.* | For the successful completion of the course the students must   * submit and present at least two assignments (50% of the final grade) * pass the written exams of the course (50% of the final grade) |

1. **ATTACHED BIBLIOGRAPHY**

|  |
| --- |
| * D.C. Montgomery and  C.G. Runger (2017). Applied Statistics and Probability for Engineers, 6th Edition, Tziolas Eds. (In Greek) * C. Caroni. and P. Economou (2017). Regression Models. Simeon, Athens, 2nd Edition (In Greek). * Oakland, J. and Oakland, R. (2018). Statistical Process Control (7th ed.). Routledge * Chatfield, C. and Xing, H. (2019). The Analysis of Time Series: An Introduction with R (7th ed.). Chapman and Hall/CRC. |