

## COURSE OUTLINE

### (1) GENERAL

|   |   |                 |   |
|---|---|-----------------|---|
| <b>SCHOOL</b>   | SCIENCES  |                 |   |
| <b>ACADEMIC UNIT</b>  | PHYSICS   |                 |   |
| <b>LEVEL OF STUDIES</b>   | POSTGRADUATE  |                 |   |
| <b>COURSE CODE</b>  | M223  | <b>SEMESTER</b> | 2 |
| <b>COURSE TITLE</b>   | APPLIED STATISTICS  |                 |   |
| <b>INDEPENDENT TEACHING ACTIVITIES</b><br><i>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</i> | <b>WEEKLY TEACHING HOURS</b>  | <b>CREDITS</b>  |   |
|   | 3   | 6               |   |
|   |   |                 |   |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>  |   |                 |   |
| <b>COURSE TYPE</b><br><i>general background, special background, specialised general knowledge, skills development</i>  | Special background, specialised general knowledge   |                 |   |
| <b>PREREQUISITE COURSES:</b>  |   |                 |   |
| <b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>  | Greek   |                 |   |
| <b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>  | Yes   |                 |   |
| <b>COURSE WEBSITE (URL)</b>   | <a href="http://www.physics.uoi.gr/seci/postgradcourses1.html#11">http://www.physics.uoi.gr/seci/postgradcourses1.html#11</a> |                 |   |

### (2) LEARNING OUTCOMES

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| <p><b>Learning outcomes</b></p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul> |
| <p>The course helps the student to acquire the ability to select and apply specific statistical methods to specific climatological studies topics. Especially after the successful completion of the course the student will know how to</p> <ul style="list-style-type: none"> <li>• study time series of climatic data to identify possible climate change.</li> <li>• smooth time series and compare them with each other.</li> <li>• compare frequency distributions of two climatic parameters.</li> <li>• seek periodicities in climatic time series.</li> <li>• study relationships between many variables (in space and time) using modern multivariate statistical methods</li> </ul>      |

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

### (3) SYLLABUS

Meteorological observations – quality control - errors. Regression line – linear trend - test Mann-Kendall. Smoothing of time series – moving averages – moving averages with weights. Comparison of mean values. Correlation coefficient – limits of correlation coefficient – statistically significant values. Stepwise Regression Analysis. Contingency Tables. Periodic functions – Harmonic (Fourier) Analysis. Power Spectrum Analysis. Multivariate statistical methods. Principal Component Analysis. Cluster Analysis. Canonical Correlation Analysis.

### (4) TEACHING and LEARNING METHODS - EVALUATION

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|---|---|--------------------------|
| <b>DELIVERY</b><br><i>Face-to-face, Distance learning, etc.</i>   | Face-to-face  |                          |
| <b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b><br><i>Use of ICT in teaching, laboratory education, communication with students</i>   | Students work on computers using modern statistical packages. |                          |
| <b>TEACHING METHODS</b><br><i>The manner and methods of teaching are described in detail.<br/>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational</i> | <b>Activity</b>   | <b>Semester workload</b> |
|   | Lectures  | 64                       |
|   | Exercises   | 64                       |
|   | Study of Bibliography   | 19                       |
|   | Exams   | 3                        |

|   |   |            |
|---|---|------------|
| <i>visits, project, essay writing, artistic creativity, etc.</i><br><br><i>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</i>  |   |            |
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|   |   |            |
|   | <b>Course total</b>                     | <b>150</b> |
| <p align="center"><b>STUDENT PERFORMANCE EVALUATION</b></p> <p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> | Examinations at the end of the semester |            |

#### (5) ATTACHED BIBLIOGRAPHY

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| <ul style="list-style-type: none"> <li> <p>● <b>ΜΕΘΟΔΟΙ ΚΛΙΜΑΤΙΚΗΣ ΑΝΑΛΥΣΗΣ</b><br/> <b>A.A. Μπλούτσιου</b><br/>           Πανεπιστήμιο Θεσσαλονίκης (1984)<br/>           Σελίδες 248</p> </li> <li> <p>● <b>Theory and Problems of STATISTICS</b><br/> <b>M.R. Spiegel</b><br/>           McGraw-Hill Book Company, New York (1972)<br/>           Σελίδες 360</p> </li> <li> <p>● <b>ΣΤΑΤΙΣΤΙΚΗ – Θεωρία Εφαρμογές</b><br/> <b>Φ. Κολυβά-Μαχαίρα, Ε. Μπόρα-Σέντα</b><br/>           Εκδόσεις Ζήτη, Θεσσαλονίκη (1999)<br/>           Σελίδες 495</p> </li> </ul> |
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