

## COURSE OUTLINE

### (1) GENERAL

|  |   |                 |          |
|--|---|-----------------|----------|
| <b>SCHOOL</b>                                    | SCHOOL OF SCIENCES  |                 |          |
| <b>ACADEMIC UNIT</b>                             | DEPARTMENT OF MATHEMATICS   |                 |          |
| <b>LEVEL OF STUDIES</b>                          | UNDERGRADUATE PROGRAM   |                 |          |
| <b>COURSE CODE</b>                               |   | <b>SEMESTER</b> | <b>B</b> |
| <b>COURSE TITLE</b>                              | CALCULUS II   |                 |          |
| <b>INSTRUCTOR</b>                                | Konstantinos Gkikas   |                 |          |
| <b>INDEPENDENT TEACHING ACTIVITIES</b>           | <b>WEEKLY TEACHING HOURS</b>  | <b>CREDITS</b>  |          |
|  | 6   | 9               |          |
| <b>COURSE TYPE</b>                               | General knowledge   |                 |          |
| <b>PREREQUISITE COURSES:</b>                     | NO  |                 |          |
| <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.math.aegean.gr/index.php/en/academics/undergraduate-programs">http://www.math.aegean.gr/index.php/en/academics/undergraduate-programs</a> |                 |          |

### (2) LEARNING OUTCOMES

|  |
|--|
| <b>Learning outcomes</b>   |
| <p>The principal aim of the course is the study of Series of real numbers, uniform continuity, Riemann integral, indefinite integral and Taylor's theorem. During the course, emphasis is given in the demonstration of these notions by a great variety of examples and exercises. After completing this course, students should demonstrate competency in the following skills:</p> <ul style="list-style-type: none"> <li>• To understand and suitably apply the basic notions and criteria of series convergence.</li> <li>• To understand and suitably apply the notion of uniform continuity.</li> <li>• To understand and suitably apply integration methods and more specifically to be able to calculate a Riemann and indefinite, and an improper integral.</li> <li>• To understand and suitably apply Taylor's theorem.</li> </ul> |
| <b>General Competences</b>   |
| Working independently. Team working. Working in an interdisciplinary environment.  |

### (3) SYLLABUS

|   |   |   |
|---|---|---|
| <ol style="list-style-type: none"> <li>1. Sequences. Series of real numbers. Series Convergence. Series convergence criteria. Alternating series. Absolute and conditionally convergent of series. Dirichlet Criterion. Rearrangements of series. Power series. (4 weeks)</li> <li>2. Uniform continuity. Uniform continuity: definition, characterization using sequences. Uniform continuity of continuous functions in closed intervals. (1 week)</li> <li>3. Riemann integral for bounded functions. Criterion Riemann, integrability of continuous and monotonous functions. Properties of the integral. Fundamental theorem of calculus. Integration methods. Improper integrals and convergent criteria. (5,5 weeks)</li> <li>4. Theorem Taylor and power series. Formulas for the remainder of Taylor theorem, Taylor expansion of basic functions, expansions of functions in power series. (2,5 weeks)</li> </ol> |   |   |
| <table border="1" style="width: 100%;"> <tr> <td style="background-color: #e0e0e0;"><b>TEACHING MATERIAL</b></td> <td>The teaching material of the course is uniformly distributed during the</td> </tr> </table>   | <b>TEACHING MATERIAL</b>  | The teaching material of the course is uniformly distributed during the |
| <b>TEACHING MATERIAL</b>  | The teaching material of the course is uniformly distributed during the |   |

|                     |           |
|---------------------|-----------|
| <b>DISTRIBUTION</b> | semester. |
|---------------------|-----------|

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

|   |  |                          |
|---|--|--------------------------|
| <b>DELIVERY</b>   | Face-to-face lectures  |                          |
| <b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> | <ul style="list-style-type: none"> <li>• Communication with students via e-mail</li> <li>• Uploading course material on moodle system</li> </ul>   |                          |
| <b>TEACHING METHODS</b>                                 | <b>Activity</b>  | <b>Semester workload</b> |
|   | Lectures   | 52                       |
|   | Tutorials  | 26                       |
|   | Independent study  | 147                      |
|   | Course total (25 per ECTS)   | <b>225</b>               |
| <b>COURSE COMMITMENTS</b>                               | Attending course and tutorial sessions is not obligatory.  |                          |
| <b>STUDENT PERFORMANCE EVALUATION</b>                   | Student's evaluation is done in Greek through a written examination which includes short-answers questions and problem solving. For students with disabilities, evaluation takes place via oral exams. |                          |

#### (5) ATTACHED BIBLIOGRAPHY

1. Σ. Ντούγιας. Απειροστικός Λογισμός Τόμος Β. Εκδόσεις Leader Books, 2007.
2. Σ. Νεγρεπόντης, Σ. Χ. Γιωτόπουλος, Ε. Γιαννακούλιας. Απειροστικός Λογισμός, ΤΟΜΟΣ ΙΙα. Εκδόσεις Συμμετρία, 2000.
3. Finney R.L., Weir M.D., Giordano F.R. Calculus. Addison Wesley-Longman, 10th ed., 2001
4. Θ. Ρασσιάς. Μαθηματικά Ι β έκδοση. Εκδόσεις Τσότρας, 2017.