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|---|---|---|---|---|---|---|---|
| **INSTITUTION** | **NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS** | | | | | | |
| **SCHOOL** | **SCHOOL OF SCIENCE** | | | | | | |
| **DEPARTMENT** | **INFORMATICS AND TELECOMMUNICATIONS** | | | | | | |
| **COURSE LEVEL** | **UNDERGRADUATE** | | | | | | |
| **COURSE TITLE** | **Calculus II** | | | | | | |
| **COURSE CODE** | **K06** | | **Semester** | **3** | **ECTS** | **8** | |
| **TEACHING HOURS per week** | **THEORY** | **4** | **SEMINAR.** | **2** | **LABORATORY** | | |
| **COURSE TYPE** | **Select one of the following and delete the rest**<br>Compulsory<br>**K** **E1** **E2** **E3** **E4** **E5** **E6** | | | | | | |
| **URL** | https://eclass.uoa.gr/courses/D260/ | | | | | | |
| **EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:** | Recommended K01 | | | | | | |
| **TEACHING AND EXAMINATIONSLANGUAGE:** | GREEK | | | | | | |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | Yes, in the English language for Erasmus students | | | | | | |

**COURSE CONTENT**

- Vectors, vector functions, inner and outer product, lines, planes, surfaces, arc length, unit tangent vector, TNB frame, multivariable functions, derivatives, limit, continuity.
- Partial derivatives, chain differentiation, directional derivative, tangent planes, linearization, differentials, extrema and saddle points.
- Taylor's theorem for multivariable functions.
- Curvilinear coordinate systems, norm, gradient, divergence and curl.
- Double and triple integrals in Cartesian and other coordinates, applications to the evaluation of areas, moments of inertia and centers of mass, change of variables (Jacobian determinants).
- Integration of vector fields, line and surface integrals, path independence, potential functions and conservative fields, Green, Gauss and Stokes theorems and applications.

| STUDENT LEARNING OBJECTIVES |
|---|
| In this course the student acquires the basic knowledge on multivariable and vector valued functions. This mathematical knowledge is necessary for the understanding of the physical laws and the ability to deal with problems that appear in all physics classes in the following semesters.<br><br>With the completion of the course the student is able to:<br>• Describe the formulation of physical phenomena that take place in the real three-dimensional space and laws that the variables involved are vectors.<br>• Approximately elaborate on useful and complicated expressions by expanding in appropriate parameters.<br>• Make use of differential and integral calculus to resolve problems in the three-dimensional space, as well as, restricted on subsets (curves and surfaces) of it. |

| TEACHING AND LEARNING METHODS - ASSESSMENT | |
|---|---|
| **TEACHING METHOD** | In Class (Face to Face) |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES** | Learning process supported by the e-class platform. |
| **TEACHING ORGANIZATION**<br>*Describe in detail the way and methods of teaching:*<br>*Enhanced Lectures,*<br>*Online Lectures,*<br>*Seminars,*<br>*Tutorial,*<br>*Laboratory,*<br>*Laboratory Exercise,*<br>*Study & analysis of literature,*<br>*Practice (Positioning),*<br>*Interactive teaching,*<br>*Developing a project,*<br>*Individual / group work*<br>*Telework (reference to tools)etc.*<br><br>*Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS* | |

| **Activity** | ***Student Workload*** *(hours)* |
|---|---|
| Lectures | 52 |
| Seminars | 26 |
| Individual Study/ Study and Analysis of bibliography / Preparation | 140 |
| ***Total Course (25 hours of workload per unit of credit)*** | ***218*** |

**ASSESSMENT OF STUDENTS**

*Description of the assessment process*

*Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other*

*Fully defined evaluation criteria are mentionedand if and where they are accessible to students.*

| Assessment methods | *Number* | *Percentage* |
|---|---|---|
| Final written exams | 1 | 100% |

**LITERATURE AND STUDY MATERIALS / READING LIST**

- Διανυσματικός Λογισμός, Marsden J., A. Tromba, ΙΤΕ ΠΑΝ/ΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ,
- Απειροστικός Λογισμός *(σε έναν Τόμο),* Β. Tomas, ΙΤΕ ΠΑΝ/ΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ,
- Απειροστικός Λογισμός σε πολλές μεταβλητές, Τ. Χατζηαφράτης, ΕΚΔΟΣΕΙΣ Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ& ΣΙΑ Ο.Ε,
- Εφαρμοσμένος Απειροστικός Λογισμός, Λ.Ν. Τσίτσας, ΕΚΔΟΣΕΙΣ Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ& ΣΙΑ Ο.Ε,
- Μαθηματικά ΙΙ, Β' έκδοση, Θ. Μ. Ρασσίας, ΕΚΔΟΣΕΙΣ ΑΘ. ΤΣΟΤΡΑΣ