

COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_PM106	SEMESTER OF STUDIES	3 rd
COURSE TITLE	CALCULUS III		
INDEPENDENT TEACHING ACTIVITIES <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>		TEACHING HOURS PER WEEK	ECTS CREDITS
Lectures and Tutorials		5	8
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Background		
PREREQUISITE COURSES:	Recommended prerequisite knowledge: CALCULUS I and II		
TEACHING AND ASSESSMENT LANGUAGE:	Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBPAGE (URL)			

2. 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 student who completes this course will have a basic knowledge of calculus of several variables. In particular (s)he will be in a position to:

- Calculate limits of functions of several variables, calculate partial derivatives (in particular higher derivatives of composite functions) as well as directional derivatives, to handle the concept of differentiability of functions of several variables.
- Calculate local as well as global maxima and minima of functions of several variables over suitable domains and use Lagrange multipliers for constrained minima and maxima.
- Calculate the Jacobian of a mapping.
- Handle the continuity and differentiability of vector-valued functions.
- Know the algebra of differential operators grad, div, curl.
- Calculate double and triple integrals and use them in applications.
- Calculate surface integrals, know the content of the theorems of Green, Stokes, Gauss and be able to verify the respective identities.

General Abilities

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, analysis and synthesis of data and information using appropriate technologies.
- Decision making.
- Adaptation to new situations.
- Working in an interdisciplinary environment.
- Autonomous Work.
- Teamwork.
- Production of new research ideas.
- Promotion of free, creative and inductive thinking.

3. COURSE CONTENT

Functions of several variable. Limits. Partial derivatives, directional derivatives, geometric interpretation. Differentiable functions. Composite functions, higher order partial derivatives. Interchange of partial derivatives. Local maxima and minima. Change of variables, Jacobian. Local extrema, conditional extrema and Lagrange multipliers. Vector valued functions, continuity and differentiation. Scalar and vector fields. Differential operators, grad, div, curl in several coordinate systems, Poincaré's theorem. Double and triple integrals. Surface integrals, theorems of Green, Stokes, Gauss.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD <i>Face-to-face, Distance learning, etc.</i>	Lectures (face to face)	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES <i>Use of ICT in teaching, laboratory education, communication with students</i>		
TEACHING ORGANIZATION <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <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 ECTSards του ECTS</i>	Activity	Semester workload
	Lectures	39
	Tutorials	26
	Solving suggested exercises	45
	Hours of self-study by the student	87
	Final examination	3
	Total number of hours for the Course (25 hours of work-load per ECTS credit)	200
STUDENT ASSESSEMENT <i>Description of the evaluation procedure</i> <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> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students</i>	Assessment Language: Greek Assessment Language for Erasmus students: English Assessment methods: Written Final Course Examination including ✓ comprehension questions, and ✓ problem solving. Minimum passing grade: 5 Maximum passing grade: 10	

5. RECOMMENDED LITERATURE

(in Greek)

- Marsden Jerold E. and Tromba Antony J. *Διανυσματικός Λογισμός*. (μετάφραση της 3^{ης} Αμερικάνικης Έκδοσης). Εκδόσεις ITE – Πανεπιστημιακές Εκδόσεις Κρήτης, 2015.
- Brand Luis. *Μαθηματική Ανάλυση*. Εκδόσεις Ελληνικής Μαθηματικής Εταιρείας, 1984.
- Βλάχος Λουκάς. *Διαφορικός Λογισμός Πολλών Μεταβλητών*. 2η Έκδοση, Εκδόσεις Τζιόλα, 2008.
- Γιαννούλης Ιωάννης. *Διανυσματική Ανάλυση*. (e-book). Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. Αποθετήριο "Κάλλιπος", 2016.