COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences		
ACADEMIC UNIT	Physics Department		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**12**	**SEMESTER**	**1**
COURSE TITLE	Differential and integral calculus		

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**
	5	7
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*	General background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=162

(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 course introduces students to the basic principles of differential and integral calculus. Upon successful completion of this course students should be able to:

- **calculate the limits, determine the possible continuity, and generally study real functions of both one and many variables.**
- **calculate derivatives of functions of one variable and partial derivatives of functions of many variables.**
- **calculate indefinite, definite, and improper integrals of functions of one variable.**

- **study the convergence of sequences, series, and power series.**

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently.
- Production of free, creative and inductive thinking.

(3) SYLLABUS

Real functions of one variable. Limits and continuity. Derivative and differential. Applications of derivatives. Indefinite, definite and improper integral. Applications of integrals. Sequences, series, power series, Taylor and Maclaurin series. Functions of many variables, partial derivatives, total differential, and their applications in Physics. Implicit differentiation, Leibniz's rule. Extremal and saddle points, Lagrange multipliers, applications.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face teaching.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The Moodle e-learning platform is used for the delivery of lecture notes and exercises to the students.

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	52	
Exercises	26	
Study & analysis of bibliography	63	
Non-directed study	31	
Examination	3	
Course total	***175***	

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*	Problem-solving written examination at the end of semester.

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- "Thomas's Calculus", R.L. Finney, M.D. Weir, F.R. Giordano, Crete University Press, ISBN: 978-960-524-182-7 (in Greek).
- "Calculus", Michael Spivak, Crete University Press, ISBN: 978-960-524-302-9 (in Greek).
- "Calculus, volume I", G. N. Pantelides, Ziti Publications, ISBN: 960-456-118-9 (in Greek).