COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**MAY211**	**SEMESTER**	**2nd**
COURSE TITLE	Infinetisimal Calculus II		

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	7.5
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:	None (from the typical point of view). Without the knowledge earned from the course "Infenitisemal Calculus I" will be nearly impossible to follow this course.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek.
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (exams in English are provided for foreign students)
COURSE WEBSITE (URL)	http://www.math.uoi.gr/GR/studies/undergraduate/courses/may211.htm

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*

This course is the sequel of the course “Infinetisimal Calculus I”. The student will get in contact with more notions and techniques in the branch of Analysis. In this course the students:

a) Are taught the notions of convergence and absolute convergence of series. They learn criteria and theorems concerning these notions as well as they learn how to compute sums of series. They are introduced in the notion of power series and they learn how to calculate the radius of convergence of a power series.
b) Are taught the notion of uniform continuity and they learn to distinguish this notion from continuity.
c) Are taught the notion of Riemann integral and various theorems concerning this notion. They also learn various integrating techniques.
d) Are taught Taylor’s theorem and they learn to write a given function as a Taylor 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
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

The course provides inductive and analytical thinking, the students evolve their computational skills and they get knowledge necessary for other courses during their undergraduate studies.

SYLLABUS

Series, convergence of series and criteria for convergence of series. Dirichlet’s criterion, D’ Alembert’s criterion, Cauchy’s criterion, integral criterion. Series with alternating signs and Leibnitz’s theorem. Absolute convergence and reordering of series, Power series, radius of

convergence of power series.

Uniform continuity, definition and properties. Characterization of uniform continuity via sequences. Uniform continuity of continuous functions defined on closed intervals.

Riemann integral, definition for bounded functions defined on closed intervals. Riemann's criterion, integrability of continuous functions. Indefinite integral and the Fundamental theorem of Calculus. Mean Value theorem of integral calculus, integration by parts, integration by substitution. Integrals of basic functions, integrations of rational functions. Applications of integrals, generalized integrals, relation between generalized integrals and series.

Taylor polynomials, Taylor's Theorem, forms of the Taylor remainder. Taylor series and expansions of some basic functions as Taylor series.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Due to the theoretical nature of this course the teaching is exclusively given in the blackboard by the teacher.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>The students may contact their teachers by electronic means, i.e. by e-mail.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>65 hours</td></tr>
<tr><td>Studying theory and solving exercises</td><td>65 hours</td></tr>
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<tr><td>Course total</td><td>130 hours</td></tr>
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<tr><td>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,</td><td>Exams in the end of the semester (mandatory).
Assignments of exercises during the semester (optional).</td></tr>
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problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	

ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Γενικά Μαθηματικά - Απειροστικος Λογισμός τόμος Ι, Χ. Αθανασιάδης, Ε. Γιαννακούλιας, Σ. Γιωτόπουλος, Εκδόσεις Συμμετρία.
- "Απειροστικός Λογισμός Τόμος ΙΙα" Σ. Νεγρεπόντης, Σ. Γιωτόπουλος, Ε. Γιαννακούλιας, Εκδόσεις Ζήτη.
- "Απειροστικός Λογισμός τομος Β", Σ. Ντούγιας, Leader Books.
- "Thomas, Απειροστικός Λογισμός", R.L. Finney, M.D. Weir, F.R.Giordano, Πανεπιστημιακές Εκδόσεις Κρήτης, (Απόδοση στα ελληνικά: Μ. Αντωνογιαννάκης).
- "Διαφορικός και Ολοκληρωρικός Λογισμός: Μια εισαγωγή στην Ανάλυση", Michael Spivak, Πανεπιστημιακές Εκδόσεις Κρήτης (Μετάφραση στα ελληνικά: Α. Γιαννόπουλος).