

COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MAY611	SEMESTER	6
COURSE TITLE	Complex Functions I		
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>		WEEKLY TEACHING HOURS	CREDITS
Presentations, exercises, lectures		5	7.5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	Calculus		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	http://www.math.uoi.gr/GR/studies/undergraduate/courses/perigr/MAE_611.pdf		

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*

It is the most basic introductory course of Real Analysis of the complex space. The student begins to understand the mean of the complex numbers and its properties. He/she learns about the use of the complex numbers field in solving some real numbers problems. The student learns about the elementary complex functions and then he/she learn about the line integral as well as the complex integral of such functions. Especially, the advantage of such integrals and their important properties are emphasized. Finally, the student learns the use of complex integrals in computing improper integrals of real functions.

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

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

SYLLABUS

The complex plane, Roots, Lines, Topology, Convergence, Riemann sphere, analytic properties of complex functions, Power series, elementary functions (rational, exp, log, trigonometric functions, hyperbolic, functions), line integrals, curves, conformal mappings, homotopic curves, local properties of complex functions, basic theorems, rotation index, General results, singularities, Laurent series, Residuum, Cuchy Theorem, Applications.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT for the presentation and communication for submission of the exercises

TEACHING METHODS <i>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.</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 ECTS</i>	Activity	Semester workload
	Lectures	78
	Home exercises	20
	Essay writing	120
	Course total	218
STUDENT PERFORMANCE EVALUATION <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>	Greek Written work (100%) on the theory and solving problems.	

ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

GEORGE L. KARAKOSTAS, INTRODUCTION TO COMPLEX ANALYSIS, KOSTARAKI ED., 2015 (Greek)

Jeff Achter, Introduction to Complex Variables, Colorado State University, 2006.

Lars V. Ahlfors, Complex Analysis, McGraw-Hill, 1966.

Joseph Bak and Donald J. Newman, Complex analysis, Springer-Verlag, 1982.

Walter Rudin, Real and Complex Analysis, 2nd ed., McGraw-Hill, New York, 1974.