

COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MAY514	SEMESTER	Winter
COURSE TITLE	Introduction to Differential Equations		
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
		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>	General background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	Through the platform “e-course” of the University of Ioannina		

LEARNING OUTCOMES

Learning outcomes <i>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.</i> <i>Consult Appendix A</i> <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> <i>Guidelines for writing Learning Outcomes</i>
The course is the introductory course to ordinary differential equations and aims to a general introductory description of the area of ordinary differential equations. It is expected that the students take basic knowledge on: A) How to solve linear ordinary differential equations of first order and some equations of special types.

- B) Existence and uniqueness of solutions to ordinary differential equations
- C) General theory of linear o.d.e.
- D) How to solve linear equations and systems with constant coefficients.
- E) How to solve linear o.d.e. of second order by the use of power series.
- F) Use of Laplace transformations to solve o.d.e..
- G) How to solve first order linear partial differential equations.

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

Production of free, creative and inductive thinking

Analytic and synthetic thinking

SYLLABUS

Introduction to differential equations and initial value problems. O.d.e.'s of some special types (Bernoulli, Riccati, Clairaut, Lagrange). Equations with separated variables. Exact equations. Integral factors. Second order equations reduced to first order equations. Existence and uniqueness theorems. General theory of linear o.d.e.'s. Linear equations and systems with constant coefficients. Power series solutions for second order d.e.'s. Partial differential equations: solutions to first order equations, classification of linear equations of second order. Applications of d.e.'s to problems arising in various areas of science and technology.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	<i>Face-to-face (Lectures)</i>	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	The platform "e-course" of the University of Ioannina	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i>	Activity	Semester workload
	Lectures	45
	Assignments,/Tests	52,5

<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 ECTS</i>		
	Individual study	90
	Course total	187,5
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>	Written Final Examination (Theory and Exercises) 100%	

ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals:

X. Φίλος, Μία Εισαγωγή στις Διαφορικές Εξισώσεις

N. Μυλωνάς, X. Σχοινάς, Διαφορικές Εξισώσεις, Μετασχηματισμοί και Μιγαδικές Συναρτήσεις

Θ Κυβεντίδη, Διαφορικές Εξισώσεις

R. Agarwal, D. O'Regan, H. Agarwal, Introductory Lectures on Ordinary Differential Equations

F. Ayres, Differential Equations

-Relative Journals