

COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MAE_822	SEMESTER	8
COURSE TITLE	Topics in geometry		
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
		3	6
<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:	Linear Algebra, Elementary differential geometry, Calculus, Analysis of several variables		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English)		
COURSE WEBSITE (URL)			

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>
This course introduces the notion of differential forms. The aim of the course is to prove Stokes theorem for manifolds and to provide applications in differential geometry as well as in other areas of mathematics. The course requires tools from Linear Algebra, Calculus of several variables, Topology and elementary differential geometry.

On completion of the course the student should be familiar with differential forms and the meaning of Stokes theorem.

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

- 1) Work autonomously.
- 2) Work in teams.
- 3) Develop critical thinking skills.

SYLLABUS

Differential forms in $\mathbb{R}^n$, line integrals, differentiable manifolds (with or without boundary), integration of differential forms on manifolds, theorem of Stokes and applications. Poincaré lemma, differential geometry of surfaces, structure equations of $\mathbb{R}^n$.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Direct	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>		
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	39
	Autonomous study	111
	Course total	150
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	

ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- *Related academic journals:*

Manfredo do Carmo, Διαφορικές Μορφές, Θεωρία και Εφαρμογές, Prentice-Hall, Πανεπιστημιακές Εκδόσεις Κρήτης, 2010