

COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	MAE525	SEMESTER	Fall
COURSE TITLE	Group Theory		
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
Interactive, Presentations		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>	<i>Special background, skills development.</i>		
PREREQUISITE COURSES:	422, Algebraic Structures I		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	http://www.math.uoi.gr/~nondas_k/GroupsNotesLONG2.pdf		

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>
Familiarity with: group, abelian group, subgroup, normal subgroup, quotient group, direct product of groups, homomorphism, isomorphism, kernel of a homomorphism. Apply group theory to describe symmetry, describe the elements of symmetry group of the regular n-

gon (the dihedral group D_{2n}). Compute with the symmetric group. Know how to show that a subset of a group is a subgroup or a normal subgroup. State and apply Lagrange's theorem. State and prove the isomorphism theorems. Sylow theorems. The classification of finite abelian groups. Normal series, central series, nilpotent groups. Applications in Geometry.

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

Study particular characteristics of group theory in topology and geometry.

Independent and team work.

Working in an interdisciplinary.

SYLLABUS

Basic properties in groups.

Symmetries.

Subgroups, Direct products, Cosets.

Symmetric groups.

Normal Subgroups, Quotient groups.

Homomorphisms.

Semidirect product.

Classification of finite abelian groups.

Sylow theorems.

Normal series, Solvable groups. Central series, Nilpotent groups

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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>	communication with students	
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	26
	Working hours in class	13
	Project	30
	Assignments	40
	Final exam	41
	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 Examination, Oral Presentation, tests, written assignments.	

ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

An Introduction to the Theory of Groups (Graduate Texts in Mathematics) 4th Edition by Joseph Rotman

Θεωρία ομάδων

Μιχάλης. Α. Γεωργιακόδης - Παναγιώτης. Ν. Γεωργιάδης

M.A. Armstrong: «Ομάδες και Συμμετρία» (Κεφ. 1-24), Εκδόσεις «Leaderbooks»,