

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCIENCE		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	POSTGRADUATE Studies in Mathematics		
COURSE CODE	313-1106	SEMESTER	B
COURSE TITLE	Convex Geometric Analysis		
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	10	
<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>	SPECIALISED GENERAL KNOWLEDGE		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://www.samos.aegean.gr/samos_math/pms/lessonseng.php		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><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></p> <p>Consult Appendix A</p> <ul style="list-style-type: none"> ● <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> 		
<p>Mastering the material described in the syllabus (see (3) below)</p>		
<p>General Competences</p> <p><i>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?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i> </td> <td style="width: 50%; border: none;"> <i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i> </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
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<p>Working independently</p>		

Working in an interdisciplinary environment
 Production of free, creative and inductive thinking

(3) SYLLABUS

Convex sets and convex functions in R^n . Jensen inequality and Minkowski inequality.
 Norms and convex bodies in R^n . The notion of volume in R^n , Properties of volume.
 Hausdorff distance and the Blaschke selection theorem.
 Prekopa-Leindler and Brunn-Minkowski inequalities. Brunn's principle and the isoperimetric inequality on the Euclidean space.
 Steiner symmetrization and the Blaschke-Santaló inequality
 John position of a convex body in R^n . The Brascamp-Lieb inequality and the reverse Isoperimetric inequality.
 The isotropic position of a convex body in R^n .
 The concentration of measure phenomenon.
 Haar measure and the Dvoretzky-Milman theorem.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Communication with students via e-mail	
<p style="text-align: center;">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></p> <p><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></p>	Activity	Semester workload
	Lectures	39
	Independent study	148.5
	Assignments	62.5
	Course total (25 per ECTS)	250
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><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></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Student evaluation is done in Greek through a written examination which includes short-answer equations and problem solving.</p> <p>For students with disabilities, evaluation takes place via oral exams.</p>	

(5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

1. P. M. Gruber. Convex and Discrete Geometry, Grundlehren der mathematischen Wissenschaften, Springer-Verlag 2007.
2. R. Schneider. Convex Bodies: The Brunn-Minkowski Theory, Second expanded edition. Encyclopedia of Mathematics and its Applications, 151. Cambridge University Press, Cambridge, 2014.
3. S. Artstein-Avidan, A. Giannopoulos and V. D. Milman. Asymptotic Geometric Analysis, Vol. I, Mathematical Surveys and Monographs, 202. American Mathematical Society, 2015.
4. *Real Analysis: Modern techniques and their applications*, G. Folland, 2nd Edition, Wiley & Sons, Inc. 1999.