COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	**MAT_PM466**	**SEMESTER OF STUDIES**	8th
COURSE TITLE	HARMONIC ANALYSIS		

INDEPENDENT TEACHING ACTIVITIES *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*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Tutorials	4	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Elective course
PREREQUISITE COURSES:	RECOMMENDED PREREQUISITE KNOWLEDGE: MATHEMATICAL ANALYSIS, COMPLEX ANALYSIS, MEASURE THEORY
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

2. 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*

- Understanding the definition and basic properties of Fourier coefficients of 2π-periodic, Lebesgue integrable functions on an interval of length 2π.
- Becoming familiar with Féjer's kernel and understanding how it occurs in Fejér's theorem concerning Cesàro summability of Fourier series.
- Understanding the theorem on uniqueness of Fourier series and its consequences.
- Becoming familiar with the definition and basic properties of Dirichlet's kernel and understanding how this kernel occurs in the study of convergence of partial sums of Fourier series and in the proof of negative results concerning the pointwise convergence as well as convergence with respect to the L^1-norm.
- Understanding the concepts and basic results related to the theory of Fourier series in L^2.

Becoming familiar with the application of results and methods of Fourier analysis in proving results such as the isoperimetric inequality and the equidistribution theorem of Weyl.

General Abilities

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*Others…*
Production of new research ideas	

- Independent work
- Adaptation to novel situations
- Production of novel research ideas
- Promotion of critical and reflective thought

Promoting free, creative, inductive thought

3. COURSE CONTENT

Trigonometric polynomials, Fourier series, Riemann-Lebesgue lemma, Féjer's kernel, Féjer's theorem, uniqueness of Fourier series, Dirichlet kernel, study of partial sums of Fourier series with respect to pointwise convergence as well with respect to the L^1-norm, Parseval's identity, convergence of partial sums of Fourier series with respect to the L^2-norm, isoperimetric inequality, the equidistribution theorem of Weyl, example of continuous nowhere differentiable function.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	PowerPoint slides Support Learning through the *eClass* platform.
TEACHING ORGANIZATION *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.* *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*	
STUDENT ASSESSEMNT *Description of the evaluation procedure* *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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students*	**Assessment Language:** Greek **Assessment Language for Erasmus students:** English **Assessment methods:** Final written examination Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	52
Solving the proposed problems	65
Independent Study	30
Final Examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	**150**

5. RECOMMENDED LITERATURE (in Greek)

- Zygmund, A. *Trigonometric Series*. Πανεπιστημιακές Εκδόσεις Κρήτης, 1995.

Κολουντζάκης, Μ., Παπαχριστόδουλος, Χ. *Fourier Analysis*. Κάλλιπος, Ανοικτές Ακαδημαϊκές Εκδόσεις, 2015.