

COURSE PROFILE

Course Name	Code	Semester	Term	Theory +PS+Lab. (hour/week)	Local Credits	ECTS
Introduction to Mathematical Analysis	MATH 214	Spring	4	3+0+0	3	6

Prerequisites	Math102
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Course Language	English
Course Type	Elective
Course Lecturer	<ul style="list-style-type: none"> • Assoc.Prof. <u>Banu</u> Uzun
Course Assistant	--
Course Objectives	This course aims to allow the student to become acquainted with, and develop a certain level of proficiency in, the techniques and methods of mathematical analysis and to be able to use these techniques and methods to reinforce and solidify an understanding of the learned calculus results.
Course Learning Outcomes	<p>The students who succeeded in this course;</p> <ul style="list-style-type: none"> • will be able to understand the development of the real number system. • will be able to learn the fundamental knowledge which is necessary for countability. • will be able to understand general properties of metric and normed spaces and explain the relationship between them. • will be able to explain convergence, limit and being Cauchy sequence. • will be able to learn the notion of uniform continuity and uniform convergence. • will gain the abstract thinking ability.
Course Content	Real numbers, completeness axiom. Countable sets. Normed and metrics spaces. Open and closed sets. Sequences, Cauchy sequences, continuity, uniform continuity; sequences and series of functions. Differentiation.

COURSE CONTENT

Week	Subjects	Related Preparation
1	Remarks about the methods of proof. The Real Number System: Axioms of real numbers.	Chapter 1

2	The extended system of real numbers. The upper and lower bounds.	Chapter 1
3	Set Theory. Functions. Equivalent Sets.	Chapter 1
4	Countable sets. Cardinality. QUIZ I	Chapter 1
5	Vector space. Normed vector space. Inner product space.	Chapter 8
6	Metric Spaces: General metric spaces. Interior, exterior, boundary and closure.	Chapter 10
7	MIDTERM EXAM	--
8	Open and closed sets.	Chapter 10
9	Sequences: Convergence of sequences. Subsequences.	Chapter 10
10	Cauchy sequences. Complete metric spaces. QUIZ II	Chapter 10
11	Compact sets. Limits of Functions.	Chapter 10
12	Continuity: Definitions of continuity. Consequences of continuity.	Chapter 4
13	Uniform continuity. QUIZ III	Chapter 4
14	Uniform convergency of functions. Differentiable Functions.	Chapter 10

Course Textbooks	W.R. Parzynski, P.W. Zipse, Introduction to Mathematical Analysis, McGraw-Hill, 1987.
Recommended References	<p>Recommended reading:</p> <p>J.E. Hutchinson, Introduction to Mathematical Analysis, ANU, 1997.</p> <p>W. Rudin, Principles of Mathematical Analysis, McGraw-Hill, 3rd Edition, 1976.</p> <p>M. H. Protter and C. B. Morrey, Jr., Modern mathematical analysis, Reading, Mass., Addison-Wesley, 1964.</p> <p>S. Abbott, Understanding analysis, New York : Springer, 2001.</p>

Semester Requirements	Number	Percentage of Grade
Attendance/Participation	-	-
Laboratory	-	-

Application	-	-
Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	3	30
Homework Assignments	-	-
Presentation	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	1	35
Final/Resit Exam	1	35
Total	5	100

PERCENTAGE OF SEMESTER WORK	4	65
PERCENTAGE OF FINAL WORK	1	35
Total	5	100

Course Category	Core Courses	X
	Major Area Courses	
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution				
		1	2	3	4	5
1	To have a grasp of basic mathematics, applied mathematics and theories and applications of statistics.					X
2	To be able to use theoretical and applied knowledge acquired in the advanced fields of mathematics and statistics,					X
3	To be able to define and analyze problems and to find solutions based on scientific methods,					X

4	To be able to apply mathematics and statistics in real life with interdisciplinary approach and to discover their potentials,				X	
5	To be able to acquire necessary information and to make modeling in any field that mathematics is used and to improve herself/himself,			X		
6	To be able to criticize and renew her/his own models and solutions,			X		
7	To be able to tell theoretical and technical information easily to both experts in detail and nonexperts in basic and comprehensible way,					X
8	To be able to use international resources in English and in a second foreign language from the European Language Portfolio (at the level of B1) effectively and to keep knowledge up-to-date, to communicate comfortably with colleagues from Turkey and other countries, to follow periodic literature,				X	
9	To be familiar with computer programs used in the fields of mathematics and statistics and to be able to use at least one of them effectively at the European Computer Driving Licence Advanced Level,	X				
10	To be able to behave in accordance with social, scientific and ethical values in each step of the projects involved and to be able to introduce and apply projects in terms of civic engagement,			X		
11	To be able to evaluate all processes effectively and to have enough awareness about quality management by being conscious and having intellectual background in the universal sense,			X		
12	By having a way of abstract thinking, to be able to connect concrete events and to transfer solutions, to be able to design experiments, collect data, and analyze results by scientific methods and to interfere,					X
13	To be able to continue lifelong learning by renewing the knowledge, the abilities and the competencies which have been developed during the program, and being conscious about lifelong learning,			X		
14	To be able to adapt and transfer the knowledge gained in the areas of mathematics and statistics to the level of secondary school,				X	
15	To be able to conduct a research either as an individual or as a team member, and to be effective in each related step of the project, to take role in the decision process, to plan and manage the project by using time effectively.					

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
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Course Hours (Including Exams)	14	3	45
Tutorials	-	-	-
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	14	2	28
Presentations / Seminar	-	-	-
Project	-	-	-
Preparatory reading	14	2	28
Homework Assignments	11	2	22
Quizzes	3	3	9
Midterm Exams	1	6	6
Final / Resit Exam	1	12	12
		Total Workload	150

COURSE CATEGORY

ISCED GENERAL AREA CODES	GENERAL AREAS	ISCED BASIC AREA CODES	BASIC EDUCATIONAL AREAS	
1	Education	14	Teacher Training and Educational Sciences	0
2	Humanities and Art	21	Art	0
2	Humanities and Art	22	Humanities	0
3	Social Sciences, Management and Law	31	Social and Behavioral Sciences	0
3	Social Sciences, Management and Law	32	Journalism and Informatics	0
3	Social Sciences, Management and Law	38	Law	0
4	Science	42	Life Sciences	0

4	Science	44	Natural Sciences	0
4	Science	46	Mathematics and Statistics	100
4	Science	48	Computer	0
5	Engineering, Manufacturing and Civil	52	Engineering	0
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	0
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	0
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	0
6	Agriculture	64	Veterinary	0
7	Medicine and Welfare	72	Medical	0
7	Medicine and Welfare	76	Social Services	0
8	Service	81	Personal Services	0
8	Service	84	Transport Services	0
8	Service	85	Environment Protection	0
8	Service	86	Security Services	0