EASTERN MEDITERRANEAN UNIVERSITY
COURSE OUTLINE TEMPLATE

COURSE CODE	**MATH252**	**COURSE LEVEL**	**Undergraduate FALL 2019-2020**
COURSE TITLE	Mathematical Methods for Engineers		
COURSE TYPE			
LECTURER(S)	**Gr. 1 Assoc. Prof. Dr. Suzan Cival Buranay suzan.buranay@emu.edu.tr ext.2410 office AS254**		
ASSISTANT	Chaima Bouzouiha	chaibouz1@gmail.com	Office:AS 249, Tel: 1031
CREDIT VALUE	**(4,1) 4**	**ECTS VALUE**	**9**
PREREQUISITES	Math 152 Calculus 2		
COREQUISITES			
DURATION OF COURSE	**One semester**		
WEB LINK	Hhtp://opencourses.emu.edu.tr		

CATALOGUE DESCRIPTION

Complex numbers. Algebra of complex numbers. Polar representation. Complex functions. Limit and continuity. Analyticity. Analytic functions. Cauchy-Riemann equations. Line integrals. Cauchy integral formula. Isolated singularities. Residue theorem. Numerical error. Solution of nonlinear equations. Convergence. Solution of linear system of equations: direct and iterative methods. Interpolation. Curve fitting. Numerical differentiation and integration.

AIMS & OBJECTIVES

This course is an introduction to a broad range of numerical methods for solving mathematical problems that arise in computational science, engineering and mathematics. The goal of this course is to provide you with an understanding of some basic numerical methods so that you are able to choose appropriate techniques for solving problems and are able to interpret the results. To achieve this goal, you will be required to use MATLAB to implement numerical techniques and to study their properties.

GENERAL LEARNING OUTCOMES (COMPETENCES)

On successful completion of this course, all students will have developed **knowledge** and **understanding** of

- Numerical methods for linear and nonlinear system of equations
- Curve fitting , numerical differentiation and integration algorithms
- Elementary functions of complex variables and their differentiability
- Integrating techniques for complex integrals

On successful completion of this course, all students will have developed **their skills in**:

- Choosing the appropriate numerical algorithms for solving engineering problems and writing MATLAB programs
- Calculus of function of complex variables
- Solving applied problems by methods of functions of complex variables

On successful completion of this course, all students will have developed their appreciation of and respect for **values and attitudes** regarding the issues of

- Being familiar with basic numerical methods and solving many engineering problems in computer
- Be familiar with the language of complex calculus
- Being able to calculate complex integrals occurring in engineering areas

GRADING CRITERIA

A (excellent)	**A:85-100 , A-:80-84** Excellent understanding of the concepts and the principles as demonstrated by correct and accurate knowledge and application of theory/laws in solving problems. Response to problems is clear, legible, concise and accurate. Excellent performance.
B (good)	**B+: 75-79, B:70-74 , B-: 66-69** Better than average understanding of the concepts and the principles as demonstrated by correct and accurate knowledge and application of theory/laws in solving problems, but doesn't have the depth and outstanding quality of an "A". Response to problems is fairly clear, legible, but occasionally contains some inaccuracies. Performance exceeds the minimum requirements
C (average)	**C+:63-65 , C:59-62 , C-: 56-58** An average understanding of the concepts and the principles as demonstrated by reasonably correct knowledge and application of theory/laws in solving problems, but doesn't have any depth. Response to problems is reasonably clear, legible, but contains inaccuracies. It reveals a sufficient understanding of the material, but lacks depth in understanding and approach/application. Content and form don't go beyond basic expectations and/or display some substantial errors. Acceptable but non-exceptional performance that doesn't go beyond the minimum requirements.
D (barely sufficient)	**D+:53-55 , D:50-52** Minimal knowledge and barely sufficient understanding of the concepts and the principles as demonstrated by approximately correct application of theory/laws in solving problems. Response to problems is not very clear and is barely legible, and contains many inaccuracies. It reveals a minimum (confused) understanding of the material, and lacks depth in understanding and approach/application. Content and form do not adequately meet the basic expectations, and/or display significant errors. Performance demonstrates severe problems in one or more areas.
D- (fail)	**35-49** Unsatisfactory progress in understanding of the concept and principles, unsatisfactory knowledge of the theoretical part of and insufficient skills in solving problems.
F (fail)	Work does not meet the most minimal standards. It reveals no understanding of the material, lack of basic academic skills and knowledge, or completely incomprehensible writing. Performance is not acceptable
NG	NG grade will be given to the students as explained briefly in ATTENDANCE part.

RELATIONSHIP WITH OTHER COURSES

The course draws lots of concepts and theories from the lower level Mathematics courses like Calculus I and Calculus II

LEARNING / TEACHING METHOD

Learning through teaching is primarily based on lectures.
Learning through tutorials and Labs is primarily based on interactive problem solving allowing instant feedback.
Learning through take-home assignments helps students understand basic concepts and techniques of numerical analyses and complex variables, and some application in engineering (after-class).

ASSIGNMENTS

Assignments for the term includes:

-theoretical applications to methods
-software programs

METHOD OF ASSESSMENT

Course Grade will be computed as follows:
1. Midterm Exam % 40
2. Final Exam % 40
3. Lab works % 10
4. Quizzes % 10

IMPORTANT NOTICE

- It is compulsory to show student identification card, in order to be able to attend examinations or quizzes. Those who will not be able to show identification card will not be allowed to attend the examination.
- Students are **obligated** to attend the examinations in the scheduled room. They will not be allowed to attend the examination in a room, which is not scheduled for them.
- Students may check their examination papers within a pre-announced period of time. Information about this matter will be given in the instructions of each of the examinations.
- **Midterm Makeup Exam and Final Makeup Exam dates will be announced later**.
- Students missing the Midterm or Final Exam have to present a valid excuse within five days following the exam to be able to enter the Makeup examinations.
- There **is no** make-up examination for Quizzes.

ATTENDANCE

Attendance to the classes is **compulsory**.
* Students who attend the classes including (lectures, tutorials, lab, quizzes and exams) **less than 50%** will receive NG grade.
*Students that have **less than 50% attendance to the exams including quizzes that form the final grade will also receive NG grade in regardless the attendance percentage to the lectures, tutorials.**
***Students who attend the labs **less than 50%** will receive NG grade.

TEXTBOOK/S

1. Complex Variables and Applications, by J.W. Brown , R.V. Churchil, McGraw-Hill, 1990
2. Numerical Analysis, Richard L. Burden, J. Douglas Fires, International Edition, 9th Edition,

INDICATIVE BASIC READING LIST

1. Numerical Methods using Matlab, ed. by John H. Mathews and Kurts D. Fink. Prentice Hall,2004.
2. Numerical Methods for Mathematics Science and Engineering, John H. Mathews, Prentice Hall, 1999.

EXTENDED READING LIST
NONE

SEMESTER OFFERRED
2019-2020 FALL Semester

CONTENT & SCHEDULE
The lecture topics within the semester are as in the following schedule:

	WEEK	**COMPLEX ANALYSIS TOPICS**
1	September 23-27	Complex numbers
2	September 30- October 4	Analytic functions
3	October 7-11	Cauchy-Riemann equations Harmonic functions
4	October 14-18	Elementary functions The exponential function The logarithmic function Trigonometric functions
5	October 21-25	Complex integrals Contour integrals Cauchy integral formula
6	October 28-November	Taylor series and Laurent series
7	November 4-8	Residue. Residue theorem
8-9	November 11-23	MIDTERM EXAMINATION PERIOD
		NUMERICAL ANALYSIS TOPICS
10-11	November 25-December 6	The solution of nonlinear equations, Newton method for nonlinear systems, Solving system of linear equations
12	December 9-13	Interpolation
13	December 16-20	Curve fitting
14	December 23-30	Numerical differentiations, Numerical integrations
15,16	January 2-17	FINAL EXAMINATION PERIOD
	January 22-26	Online Application for Resit Exams
	January 30-February 5	RESIT EXAMINATIONS

PLAGIARISM
This is intentionally failing to give credit to sources used in writing regardless of whether they are published or unpublished. Plagiarism (which also includes any kind of cheating in exams) is a disciplinary offence and will be dealt with accordingly.)

PLEASE KEEP THIS COURSE SYLLABUS FOR FUTURE REFERENCE AS IT CONTAINS IMPORTANT INFORMATION