T.C. ESKİŞEHİR OSMANGAZİ UNIVERSITY
ARCHITECTURE AND ENGINEERING FACULTY
MECHANICAL ENGINEERING DEPARTMENT

COURSE INFORMATION FORM

SEMESTER	Spring

COURSE CODE	151814235 - 151834235	COURSE NAME	Engineering Mathematics

SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
4	3	0		3	5	COMPULSORY (x) ELECTIVE ( )	Turkish

COURSE CATAGORY			
Basic Science	Basic Engineering	Engineering Subjects [if it contains considerable design, mark with (√)]	Social Science
25%	75%	( )	

ASSESSMENT CRITERIA			
	Evaluation Type	Quantity	%
MID-TERM	Mid-Term	1	40
	Quiz		
	Homework		
	Project		
	Report		
	Others (……)		
FINAL EXAM		1	60

PREREQUIEITE(S)	
COURSE DESCRIPTION	Complex Analysis, Laplace Transformation, Solution of differential equations and coupled dif equations with Laplace transform and series solutions of differential equations, matrices, eigenvalues and eigenvectors, Fourier series, solution of matrice equations
COURSE OBJECTIVES	To establish the mathematical basis to develop skills for core mechanical engineering courses, to incorprate the use of relevant software in engineering calculations
ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	Give an ability to apply knowledge of mathematics to engineering problems.
COURSE OUTCOMES	1.Learn operations of complex numbers. 2.Know to Laplace and Inverse-Laplace operations. 3.Solve constant cooefficent differential equations using Laplace transformation 4.Solve partial differential equations with Laplace Transformation 5.Solve variable coefficient linear differential equations using Series method 6.Find the matrice of eigenvalues and eigenvectors 7. Find the fuction of the fourier series 8.Solve differantial equation with matrice method
TEXTBOOK	Richard Bronson, Schaum's Outlines Differential Equations. McGraw Hill-Nobel
OTHER REFERENCES	Özer N. Ve Eser D., Diferansiyel Denklemler, Eskişehir, 2002 Mathematical Handbook of Formulas and Tables, Murray R. Spiegel
TOOLS AND EQUIPMENTS REQUIRED	

COURSE SYLLABUS	
WEEK	**TOPICS**
1	Complex numbers, complex algebra and complex plane. Polar form, roots of complex numbers, functions with complex variables
2	Cauchy Integral Theorem, singular points of an analytical function, poles, Residue theorem and residue calculations, closed-path integrals in complex plane
3	Laplace transformation, definition, Laplace transform of basic functions, basic transformation rules and theorems
4	Inverse Laplace transformation,inverse transformation tables and inversion techniques using closed-path integration and with the use of partial fractions
5	Solution of initial value problems using Laplace transformation, constant coefficient linear differential equations, and constant coefficient coupled differential equations
6	Solution of variable coefficient linear differential equations, and coupled differential equations using Laplace transformation
7	Solution of partial differential equations with Laplace Transformation. Series solution of linear second order differential equation with no singular point at x=a
8	Mid-Term Examination
9	Mid-Term Examination
10	Series solution of linear second order differential equation with singular point at x=a
11	Bessel differantial equations and solutions, Bessel functions of the first and second king and its properties
12	Fourier series
13	Linear system of equations, Inverse of a Matrice, eigenvalues and eigenvectors, Cayley-Hamilton Theoremi and its applications
14	Solution of differantial equations using Matrice method
15,16	Final Exam

NO	PROGRAM OUTCOMES	3	2	1
1	Sufficient knowledge of mechanical engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of mechanical engineering problems.	[X]	[ ]	[ ]
2	Ability to determine, define, formulate and solve complex mechanical engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.	[ ]	[X]	[ ]
3	Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods.	[ ]	[ ]	[X]
4	Ability to develop, select and use modern methods and tools required for mechanical engineering applications; ability to effective use of information technologies.	[ ]	[ ]	[X]
5	In order to investigate mechanical engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.	[ ]	[ ]	[X]
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.	[ ]	[ ]	[X]
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.	[ ]	[ ]	[X]
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.	[ ]	[ ]	[X]
9	Understanding of professional and ethical issues and taking responsibility	[ ]	[ ]	[X]
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.	[ ]	[ ]	[X]
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.	[ ]	[ ]	[X]
1:None. **2**:Partially contribution. **3**: Completely contribution.				

Prepared by: Assoc. Prof. Dr. Mesut Tekkalmaz **Date:**

Signature(s):