

University of Mumbai			
Class: S.E.	Branch: Computer Engineering	Semester: III	
Subject: Applied Mathematics – III (Abbreviated as AM – III)			
Periods per Week (each 60 min.)	Lecture	05	
	Practical	00	
	Tutorial	---	
		Hours	Marks
Evaluation System	Theory	03	100
	Practical & Oral	-	-
	Oral	-	-
	Term Work	-	25
	Total	03	125

Module	Contents	Hours
1.	<p>Laplace Transform:</p> <ul style="list-style-type: none"> Function of bounded variation, Laplace Transform of standard functions such as 1, t^n, e^{at}, $\sin at$, $\cos at$, $\sin at$, $\sin hat$, $\cos hat$, $\operatorname{erf}(t)$ Linearity property of Laplace Transform, First shifting property, Second Shifting property, Change of Scale property of L.T. $L\{t^n f(t)\}, L\left\{\frac{f(t)}{t}\right\}, L\left\{\int_0^1 f(u)du\right\}, L\{f^{n(t)}\}$ <p>Heaviside Unit step function, Direct Delta function, periodic functions and their Laplace Transform.</p> <ul style="list-style-type: none"> Inverse Laplace Transform: Linearity property, use of theorems to find inverse Laplace Transform, Partial fraction method and convolution theorem (without proof) Application to solve initial and boundary value problems involving ordinary differential equations with one dependent variable. 	<p>03</p> <p>07</p> <p>06</p> <p>03</p>
2.	<p>Matrices (I):</p> <ul style="list-style-type: none"> Types of matrices, Adjoint of a matrix, Inverse of a matrix, orthogonal matrix, unitary matrix, Rank of a matrix, reduction to normal form PAQ, Linear dependence and independence of rows/ columns over a field. System of homogeneous and non-homogeneous equation, their consistency and solutions. 	<p>07</p> <p>04</p>
4.	Fourier Series:	

	<ul style="list-style-type: none"> • Orthogonal and orthonormal set, Expressions of a function in a series of orthogonal functions. Dirichlet's conditions. Fourier Series periodic function in the interval $[c, c + 2\pi], [c, c + 2l]$ • Dirichlet's theorem even and odd functions. Half range sine and cosine series. Parseval's identities (without proof) • Complex form of Fourier series • Practical harmonic analysis 	08 04 02 02
4.	Fourier Transform: Introduction, Fourier integrals-Fourier sine and cosine integrals, Fourier sine and cosine transform, Linearity property, change of scale property, shifting property, convolution theorem (without proof)	06
5.	Z-transform: Z-transform of standard functions such as $Z(a^n), Z(n^p)$, Linearity property, damping rule, shifting rules, Initial & final value theorem convolution theorem (all without proof)	06
6.	Use of Scilab (Computer software) to solve integral transform.	02

TERM WORK:

1. Based on above syllabus at least 10 tests assessed papers (10 marks)
2. One term test of 100 marks like university pattern must be conducted and sealed to 10 marks.
3. Attendance 05 marks.

Reference Books:

1. Elements of Applied mathematics, P, N & J N Wartikar, Pune Vidarthi Gruha Prakashan
2. Advanced Engineering Mathematics, E Kreyszing, Wiley Eastern Limited
3. Advanced Modern Engineering Mathematics, Glyn James
4. Fourier Transform, Schuam Series
5. Higher Engineering Mathematics, B.V.Ramanna, Tata McGraw Hill.