MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	MATHEMATICS
Course Name & code	:	Engineering Mathematics - IV & MAT-2258
Semester & branch	:	IV & Common to EE & EI
Name of the faculty	:	Dr.Prathima J, Dr.Sabitha D'souza, Dr. Harinakshi Karkera, Dr. Ashwini Bhat, Dr. Rimpa Nandi

No of contact hours/week:	L	T	P	C
	3	0	0	3

Course Outcomes (COs)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks
CO1:	Apply finite difference method to solve BVP's and IVP's and solve PDE's by numerical methods.	8	12
CO2:	Apply the concept of axiomatic approach to probability, Baye's theorem	4	7
CO3:	Solve problem related to one and two dimensional random variable and correlation coefficient.	8	9
CO4:	Solve difference equation by Z-transform	8	9
CO5:	Understand various discerete and continuous distribution. Sampling theory and function of one and two dimensional random variable.	12	13
	Total	40	50

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Assessment Plan

Components	Assignments	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding; Applying; Analyzing; Evaluating; Creating	Remembering; Understanding; Applying	Understanding; Applying; Analyzing; Evaluating; Creating
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ (10 marks): 10 questions of 0.5 marks each Short Answers (10 marks): questions of 2 or 3 marks	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	As notified by Associate Director (Academics) at the start of each semester	Calendared activity	Calendared activity
Topics Covered	Assignment 1 (L 1-8 & T 1,2,3) **(CO1)** Assignment 2 (L **10-16** & T 4) **(CO2 & CO3)** Assignment 3 (L 18-25 & T 5,6) **(CO4)** Assignment 4 (L 27-33 & T 7,8) **(CO3 & CO5)**	Test 1 (L 1-16 & T 1,2,3,4) **(CO1&CO2)** Test 2 (L 18-34 & T 5,6,7,8) **(CO3,CO4)**	Comprehensive examination covering full syllabus. Students are expected to answer all questions **(CO1-5)**

Lesson Plan

L. No./ T. No.	Topics	Course Outcome Addressed
L0	Introduction	CO1
L1	Finite difference expressions for first and second order derivatives	CO1
L2	Solution of boundary value problem of ordinary differential equation	CO1
L3	Tutorial 1	CO1
L4	Solution of boundary value problem of partial differential equation: Classification of PDE	CO1
L5	Numerical solutions of Laplace and Poisson equations by standard five point formula	CO1
L6	Tutorial 2	CO1
L7	Solution of heat equation by explicit method and Crank-Nicolsons method	CO1
L8	Numerical solution of wave equation	CO1
L9	Tutorial 3	CO1

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L10	Introduction to probability: Basic set theory and related concepts, Random experiment, sample space (finite / infinite), events, probability concepts	CO2
L11	Addition and other theorems on probability, Related problems, problems on finite sample space	CO2
L12	Conditional probability, independent events , partition for a finite sample space, total and Baye's theorem, related problem.	CO2
L13	Tutorial 4	CO2
L14	One dimensional random variable and independent events.	CO3
L15	Mean and variance of a one dimensional random variable and their properties. Problems on mean and variance of a random variable	CO3
L16	Uniformaly distributed random variable	CO3
L17	Tutorial 5	CO3
L18	Difference equations : Introduction to Difference calculus and Difference Equations,	CO4
L19	solution of non – homogeneous difference equations with constant coefficients	CO4
L20	Methods of finding particular solution	CO4
L21	Tutorial 6	CO4
L22	Z- transforms: Introduction to Z-transforms and their properties , Z-transform of some standard functions, initial and final value theorems.	CO4
L23	Inverse Z-transforms .	CO4
L24	Solutions of difference equations using Z - transforms	CO4
L25	Solutions of simultaneous difference equations using Z - transforms	CO4
L26	Tutorial 7	CO4
L27	Chebyshev's inequality, Two dimensional random variables and their properties	CO3
L28	mean and variance of two dimensional random variable	CO3
L29	covariance, correlation coefficient and their properties	CO3
L30	Tutorial 8	CO3
L31	Binomial distribution, its mean and variance.	CO5
L32	Poisson distribution, Mean and variance of a P.D	CO5
L33	Normal distribution, Mean and variance of Normal Distribution	CO5
L34	Tutorial 9	CO5
L35	Gamma, chi-square and exponential distributions	CO5
L36	Moment generating function -Binomial, Poisson, Normal distribution, Gamma, Exponential	CO5
L37	Functions of one dimensional random variable	CO5
L38	Functions of two dimensional random variables	CO5

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L39	Central limit theorem	CO5
L40	Sampling theory	CO5

References:

1. NARAYANAN, RAMANIAH, MANICAVACHAGOM PILLAY, "ADVANCED ENGINEERING MATHEMATICS", 8TH EDITION, JOHN WILEY INDIA

2. P. L. MEYER, "INTRODUCTION TO PROBABILITY AND STATISTICAL APPLICATIONS", 2ND EDITION, AMERICAN PUBLISHING CO., 1979

3. HOGG & CRAIG, "INTRODUCTION TO MATHEMATICAL STATISTICS", 4TH EDITION, MACMILLAN PUBLISHING, 1975

4. **S. C. GUPTA , V.K. KAPOOR, "FUNDAMENTALS OF MATHEMATICAL STATISTICS" SULTHAN CHAND &SONS PUBLISHER**

5. **A.V OPENHEIM , R.W.SCHAFER ,DIGITAL SIGNAL PROCESSING" PRENTICE HALL, EDN. 1975**

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Submitted by: Dr.Prathima J

(Signature of the faculty)

Date: Click or tap to enter a date.

Approved by: Dr. Sudhakara G

(Signature of HOD)

Date: 01-03-2020

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
SD	EE(A)	JP	EI(A)
AB	EE(B)	HK	EI(B)
RN	EE(C)		

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