NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

DEPARTMENT OF MATHEMATICS

MA233: Transformation Techniques and Statistics

For II Year B.Tech. MECH-A & B, ODD SEMESTER, ACADEMIC YEAR 2022-2023

SYLLABUS, LECTURE PLAN & EVALUATION SCHEME

Pre-Requisites: NIL

Course Outcomes:

At the end of the course, the student will be able to:

CO1:	Obtain the Fourier series for a given function
CO2:	Find the Fourier transform of a function
CO3:	Determine the solution of a PDE by variable separable method
CO4:	Understand the concepts of probability and statistics
CO5:	Perform testing of hypothesis

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	3	-	-	-	-	-	-	-	1	2	-
CO2	3	3	-	3	-	-	-	-	-	-	-	1	2	-
CO3	3	3	-	3	-	-	-	-	-	-	-	1	2	-
CO4	3	2	-	1	1	-	-	-	-	-	-	1	2	1
CO5	3	2	-	1	1	-	-	-	-	-	-	1	1	1

1-Slightly; 2-Moderately; 3-Substantially

Syllabus:

Fourier series: Expansion of a function in Fourier series for a given range - Half range sine and cosine expansions

Fourier Transforms: Complex form of Fourier series - Fourier transformation and inverse transforms - sine, cosine transformations and inverse transforms - simple illustrations

Partial Differential Equations: Fourier series solutions of Wave equation, Heat equation and Laplace's equation by the method of separation of variables

Statistics and Probability: Review of fundamental concepts of probability, Moments and Moment generating function of Discrete and continuous distributions, Binomial, Poisson, Normal distributions and central limit theorem, fitting these distributions to the given data, Hypothesis testing: comparison of single mean to specified value and comparison of equality of two means, Comparison of one variance to a specified value, comparison of two variance, Chi-square test for goodness of fit. - Correlation, ANOVA for testing equality of multiple means.

Text Books:

1. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House, 2016, Fifth Edition

2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley and Sons, 2015, Eighth Edition

Reference Books:

1. Advanced Engineering Mathematics, Dennis G. Zill, Jones & Bartlett Learning, 2018, Sixth Edition

2. Miller & Freund's Probability and Statistics for Engineers, Richard A. Johnson, Pearson, 2018, Ninth Edition

SCHEME OF EVALUATION:		
Evaluations	**Weightage**	**Time**
Minor-I (or, Assignments)	10% of marks	After 3 Weeks
Minor-II	20% of marks	After 6 Weeks
Minor-III (or, Assignments)	10% of marks	After 9 Weeks
Minor-IV	20% of marks	After 12 Weeks
End Semester exam	40% of marks	After 14 Weeks
TOTAL MARKS = 100		

Special Instructions:

➢ Minor exams shall be conducted between 5 PM to 6 PM without disturbing the class work.

Lecture Schedule for MA233

S.No.	Topic	CO'S	No. of Lectures
1	**Fourier series:** • Expansion of a function in Fourier series for a given range • Half range sine and cosine expansions	CO1	6
2	**Fourier Transforms:** • Complex form of Fourier series • Fourier transformation and inverse transforms • Sine, cosine transformations and inverse transforms • Simple illustrations	CO2	6
3	**Partial Differential Equations:** • Fourier series solutions of Wave equation • The method of separation of variables • Heat equation and Laplace's equation by the method of separation of variables	CO3	8
4.	Quick review of the contents discussed in Lectures 1-20		1
5.	**Statistics and Probability:** • Review of fundamental concepts of probability • Moments and Moment generating function • Discrete and continuous distributions • Binomial, Poisson, Normal distributions • Central limit theorem • Fitting these distributions to the given data • **Hypothesis testing**: • Comparison of single mean to specified value • Comparison of equality of two means • Comparison of one variance to a specified value • Comparison of two variance • Chi-square test for goodness of fit. • Correlation • ANOVA for testing equality of multiple means.	CO4 CO5	20
6.	Quick Review of Statistics and Probability		1
	Total=		42