Course Code		:	1BMAM301C	MATHEMATICS FOR MECHANICAL ENGINEERING STREAM (ME,AU,IP)	Semester	:	III
L:T:P		:	3 : 0 : 0		Course Type	:	BSC
Hours/Sem.	Teaching	:	42 Hrs		CIE Marks	:	50
	Learning (TW+SL)	:	42 Hrs		SEE Marks	:	50
	Exam	:	6 Hrs		Total Marks	:	100
	Total Hrs.	:	90 Hrs		Credits	:	03

Professional Competency:

Apply statistical, probability, joint probability, Markov chain and partial differential equation techniques to effectively solve engineering problems.

Course Outcomes

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

CO1: Apply statistical concepts to solve engineering problems.

CO2: Employ the concepts of probability for engineering problems.

CO3: Apply the concepts of joint probability and Markov chains for engineering problems.

CO4: Solve partial differential equations arising in engineering problems.

UNIT-I	**10 Hrs.**

Curve fitting, Correlation and Regressions: Principles of least squares, Curve fitting by the method of least squares in the form $y = a + bx$, $y = a + bx + cx^2$, $y = ab^x$. Correlation, Regression and Rank correlation.

UNIT–II	**11 Hrs.**

Probability: addition rule, conditional probability, multiplication rule, Baye's rule. Binomial distributions, Poisson distributions and Normal distributions (derivations for mean and standard deviation for Binomial and Poisson distributions only).

UNIT–III	**11 Hrs.**

Joint Probability distribution: Joint Probability distribution for discrete and continuous random variables, expectation, covariance and correlation.

Markov Chain: Introduction to Stochastic Process, Probability Vectors, Stochastic matrices, Regular stochastic matrices, Markov chains, Higher transition probabilities, Stationary distribution of Regular Markov chains and absorbing states.

UNIT–IV	**10 Hrs.**

Partial Differential Equations : Formation of PDE's by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Solution of homogeneous PDEs involving derivatives with respect to one independent variable only. Solution of Lagrange's linear PDE, derivation of one-dimensional heat equation and wave equation. Solution of one-dimensional heat and wave equation by the method of separation of variables.

Text Books

1. **Ronald E. Walpole, Raymond H Myers, Sharon L Myers & Keying Ye** "Probability & Statistics for Engineers & Scientists", Pearson Education, 9th edition, 2017.
2. **Peter Bruce, Andrew Bruce & Peter Gedeck** "Practical Statistics for Data Scientists" O' Reilly Media, Inc., 2nd edition **2020**.

Reference Books

1. **Erwin Kreyszig**, "Advanced Engineering Mathematics", John Wiley & Sons,9th Edition , 2006.
2. **B. S. Grewal** "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
3. **G Haribaskaran** " Probability, Queuing Theory & Reliability Engineering", Laxmi Publication , Latest Edition, 2006

4. **Irwin Miller & Marylees Miller,** John E. Freund's "Mathematical Statistics with Applications" Pearson. Dorling Kindersley Pvt. Ltd. India, 8th edition, 2014.
5. **S C Gupta and V K Kapoor** , "Fundamentals of Mathematical Statistics", S Chand and Company , Latest edition.
6. **Robert V. Hogg, Joseph W. McKean & Allen T. Craig**. "Introduction to Mathematical Statistics", Pearson Education 7thedition, 2013.
7. **Jim Pitman**. Probability, Springer-Verlag , 1993.
8. **Sheldon M. Ross,** "Introduction to Probability Models"11th edition. Elsevier, 2014.
9. **A.M. Yaglomand I. M. Yaglom**, "Probability and Information" D. Reidel Publishing Company. Distributed by Hindustan Publishing Corporation (India) Delhi,1983.
10. **P.G. Hoel , S.C. Portand C. J. Stone**, "Introduction to Probability Theory", Universal Book Stall, (Reprint), 2003.
11. **S. Ross**, "A First Course in Probability", Pearson Education India, 6th Ed.,2002.
12. **W. Feller**, "An Introduction to Probability Theory and its Applications", Vol. 1,Wiley, 3rdEd., 1968.
13. **N. P. Bali and Manish Goyal** , A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
14. **Veerarajan T**, Engineering Mathematics(for semester III),Tata McGraw-Hill, New Delhi

Web Links and Video Lectures:

https://drive.google.com/file/d/1KtCtZmnJnOvV1S68wXS9FZPXUFvRktBQ/view?usp=sharing

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes (COs)	Program Outcomes and (WKs)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	3 (WK1, WK2, WK3, and WK4)	2 (WK1, WK2 and WK3)						1			1		
CO2	3 (WK1, WK2, WK3 and WK4)	2 (WK1, WK2 and WK3)						1			1		
CO3	3 (WK1, WK2, WK3 and WK4)	2 (WK1, WK2 and WK3)						1			1		
CO4	3 (WK1, WK2, WK3 and WK4)	2 (WK1, WK2 and WK3)						1			1		

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Sl. No.	Course Code	Course Title	Teaching-Learning Scheme				Examination Duration (Hrs/Sem.)		Total Hours	Examination Scheme and Evaluation			Credits (C) = Total Hours /30
			L Hrs/ Week (Hrs/ Sem.)	T Hrs/ Week (Hrs /Sem.)	P Hrs/ Week (Hrs/Sem.)	Term Work (TW) and Self Learning (SL) (TW+SL) Hrs/ Sem.	CIE	SEE		CIE Marks	SEE Marks	Total Marks	
1	1BMAM301C	MATHEMATICS FOR MECHANICAL ENGINEERING STREAM (ME,AU,IP)	3(42)	0	0	42	3	3	90	50	50	100	3= 90/30

Scheme (from 2026-27)