



Kanpur Institute of Technology

(An Autonomous Institute of Dr. A.P.J. Abdul Kalam Technical University, Lucknow)

Accredited grade 'A' by NAAC Approved

by AICTE, New Delhi

Autonomous status approved by UGC, New Delhi

Evaluation Scheme & Syllabus

For

B.Tech. First Year

- **Computer Science & Engineering**
- **Information Technology**
- **Computer Science and Engineering (Artificial Intelligence & Machine Learning)**

(Effective from the Session: 2024-25)

Department of Computer Science & Engineering

A-1, UPSIDC Industrial Area, Roosa, Kanpur 208001(U.P.) India

Website: www.kit.ac.in/kit, E-Mail: info@kit.ac.in

Semester I										
S. NO	COURSE CODE	COURSE TITLE	TYPE	PERIODS			FA	SA	Total	CREDIT
				L	T	P				
1	AH11010	ENGINEERING MATHEMATICS-I	TH	2	1	0	70	30	100	3
2	CS11010	FUNDAMENTAL OF WEB DESIGNING	TH	2	0	0	70	30	100	2
3	CS11020	FUNDAMENTAL OF COMPUTERS AND EMERGING TECHNOLOGIES	TH	2	1	0	70	30	100	3
4	CS11030	PROGRAMMING FOR PROBLEM SOLVING	TH	3	1	0	70	30	100	4
5	AH11020	DESIGN THINKING AND INNOVATION	TH	2	0	0	70	30	100	2
6	CS11040	PROGRAMMING FOR PROBLEM SOLVING USING C LAB	PR	0	0	4	70	30	100	2
7	CS11050	PROFESSIONAL COMPUTING LAB	PR	0	0	4	70	30	100	2
8	CS11060	FUNDAMENTAL OF WEB DESIGNING LAB	PR	0	0	2	70	30	100	1
9	CA11010	CO-CURRICULAR ACTIVITIES	PR	0	0	0	100	-	100	0.5
10	GP11010	GENERAL PROFICIENCY	PR	0	0	0	100	-	100	0.5
Total ->				11	3	10	760	240	1000	20
Semester II										
S. NO	COURSE CODE	COURSE TITLE	TYPE	PERIODS			FA	SA	Total	CREDIT
				L	T	P				
1	AH12010	ENGINEERING MATHEMATICS-II	TH	2	1	0	70	30	100	3
2	AH12020	TECHNICAL COMMUNICATION	TH	3	0	0	70	30	100	3
3	CS12010	BASICS OF PYTHON PROGRAMMING	TH	2	1	0	70	30	100	3
4	CS12020	OOPS WITH C++	TH	3	1	0	70	30	100	4
5	MO12010	MOOC-01 (ONE COURSE ON C/PYTHON/C++) FROM SWAYAM PORTAL)	TH	2	0	0	70	30	100	2
6	CS12030	BASICS OF PYTHON PROGRAMMING LAB	PR	0	0	4	70	30	100	2
7	CS12040	OOPS WITH C++ LAB	PR	0	0	4	70	30	100	2
8	CA12010	CO-CURRICULAR ACTIVITIES	PR	0	0	0	100	-	100	0.5
9	GP12010	GENERAL PROFICIENCY	PR	0	0	0	100	-	100	0.5
Total ->				12	3	8	690	210	900	20

Abbreviation used:

L: Lecture

T: Tutorial

P: Practical

FA: Formative Assessment

SA: Summative Assessment

TH: Theory, **PR:** Practical

B.TECH. FIRST YEAR (SEMESTER-I)					
Course Code	AH11010	L	T	P	Credit
Course Title	ENGINEERING MATHEMATICS-I	2	1	0	3
Course Objectives: The objective of this course is to familiarize the graduate engineers with techniques in matrix, calculus, multivariate analysis and vector calculus. It aims to equip the students with standard concepts and tools from intermediate to advanced level that will enable them to tackle more advanced level of mathematics and applications that they would find useful in their disciplines. The students will learn: <ul style="list-style-type: none">• The essential tools of matrices, Eigenvalues and its application in a Comprehensive-manner.• To apply the knowledge of differential calculus in the field of engineering.• To deal with functions of several variables that is essential in optimizing the results of real life problems.• To apply integral calculus in various field of engineering and have a basic understanding of Beta and Gamma functions and application of Dirichlet's integral.• To deal with vector calculus that is required in different branches of engineering to graduate engineer.					
Pre-requisites: Knowledge of Mathematics unto 12 th standard.					

Course Contents / Syllabus		
UNIT-I	Matrices	8 hours
Elementary transformations, Inverse of a matrix, Rank of matrix, Solution of system of linear equations, Characteristic equation, Cayley-Hamilton Theorem and its application, Linear Dependence and Independence of vectors, Eigen values and Eigen vectors, Complex Matrices, Hermitian, Skew-Hermitian and Unitary Matrices.		
UNIT-II	Differential Calculus-I	8 hours
Introduction of limits, continuity and differentiability, Rolle's Theorem, Lagrange's Mean value theorem and Cauchy mean value theorem, Successive Differentiation (nth order derivatives), Leibnitz theorem, Partial derivatives, Euler's Theorem for homogeneous functions, Total derivative.		
UNIT-III	Differential Calculus-II	8 hours
Expansion of functions by Taylor's and Maclaurin's theorems for functions of one and two variables, Maxima and Minima of functions of several variables, Lagrange's method of multipliers, Jacobians, Approximation of errors.		
UNIT-IV	Multiple integration	10 hours
Double integral, Triple integral, Change of order of integration, Change of variables, Beta and Gamma function and their properties, Dirichlet's integral and its applications to area and volume, Liouville's extensions of Dirichlet's integral.		
UNIT-V	Vector Calculus	8 hours
Vector differentiation: Gradient, Curl and Divergence and their Physical interpretation, Directional derivatives. Vector Integration: Line integral, Surface integral, Volume integral, Gauss's Divergence theorem, Green's theorem and Stoke's theorem (without proof) and their applications.		

Course Outcome (CO)	Knowledge Level
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At the end of course, the student will be able to:		
CO 1	Understand the concept of complex matrices, Eigen values, Eigen vectors and apply the concept of rank to evaluate linear simultaneous equations	K2 & K5
CO 2	Remember the concept of differentiation to find successive differentiation, Leibnitz Theorem, and create curve tracing, and find partial and total derivatives	K1 & K5
CO 3	Applying the concept of partial differentiation to evaluate extrema, series expansion, error approximation of functions and Jacobians	K3 & K5
CO 4	Remember the concept of Beta and Gamma function; analyze area and volume and Dirichlet's theorem in multiple integral	K1 & K4
CO 5	Apply the concept of Vector Calculus to analyze and evaluate directional derivative, line, surface and volume integrals.	K3, K4 & K5

TEXT BOOKS
(1) B. V. Ramana, Higher Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd..
(2) B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher.
(3) R K. Jain & S R K. Iyenger , Advance Engineering Mathematics, Narosa Publishing House .
REFERENCE BOOKS:
(1) E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons.
(2) Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning.
(3) Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
(4) D. Poole, Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole.
(5) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi.
(6) Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, Tata McGraw-Hill; Sixth Edition.
(7) P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1 st Edition, Pearson Education
(8) Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg
SUGGESTED VIDEO LINKS:
1. https://www.youtube.com/watch?v=04OKphtBN7I
2. https://www.youtube.com/watch?v=4Augy2kdEUE&list=PLNKD1qB9pptuJlYVeM-wIETem5iw_oRQ
3. https://www.youtube.com/watch?v=AMr5etyUEL8&list=PLhSp9OSVmeyJUJH0kaJylaJvxayll64O
4. https://www.youtube.com/watch?v=Xfl0BIvLiV4&list=PLNKD1qB9pptvcOzCxiYxwif-AZYR7T5-q
5. https://www.youtube.com/watch?v=8d9Fo8Hj50M&list=PLNKD1qB9pptscjgENMRaCT2Jni9ukZm2Q
6. https://www.youtube.com/watch?v=fupOsH1YYkI&list=PLNKD1qB9pptvVqDg21UAS0vkd7tVUI2G
7. https://www.youtube.com/watch?v=DUuTx2nbizM
8. https://www.youtube.com/watch?v=Ktt5n0bHqM
9. https://www.youtube.com/watch?v=s2QNhckjSq0&list=PL2xF3HCNxxGM9_4QCssdTcmaQc260tuSux
10. https://www.youtube.com/watch?v=IFtjDDB8fzo&list=PLU6SqdYcYsfJlpLH35MEWnKAQYFJoLCy9
11. https://www.youtube.com/watch?v=g-jrrHPT-d4
12. https://www.youtube.com/watch?v=KijGLjxKlsY&list=PLU6SqdYcYsfLLAU6Hxi0C_TnrZeegbJMJ
13. https://www.youtube.com/watch?v=EGnI8WYyB3o&list=PLU6SqdYcYsfIsER5aEx21e8CSOIzhb-Rd
14. https://www.youtube.com/watch?v=bTs7ncA_AtY
15. https://www.youtube.com/watch?v=9GKfvknvTQk
16. https://www.youtube.com/watch?v=1c5mCr8QFRA&list=PLpklqhlbn1jonjRbrpRdjL5uHwgNvIy9d
17. https://www.youtube.com/watch?v=Ac1mr2WrOg&list=PLU6SqdYcYsfKEgfOKHsHUdEq3uA8KA0w0