Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

First Year Bachelor of Engineering (All Branches)

(With Effect From: Academic Year 2017-18)

Subject Code:	CC201-N	Subject Title : ENGINEERING MATHEMATICS – II
Pre-requisite		**-**

Course Objective:

- To present the foundations of many basic Mathematical tools and concepts related Engineering.
- To provide a coherent development to the students for the courses of various branches of Engineering like Control Theory , Circuits and Networks, Digital Logic design ,Fluid Mechanics, Machine Design etc
- To enhance the student's ability to think logically and mathematically.
- To give an experience in the implementation of Mathematical concepts which are applied in various field of Engineering.

Teaching scheme				Total Credit	Evaluation Scheme					Total Marks
					Theory		Mid Sem Exam Marks	CIA Marks	Pract. Marks	
L	**T**	**P**	**Total**		**Hrs**	**Marks**				
Hrs	**Hrs**	**Hrs**	**Hrs**							
04	01	00	05	05	03	70	30	50	00	150

Outline of the Course:

Unit No	Topics
1	Matrix Theory and Application of Matrices
2	Eigen value and Eigenvector and Applications
3	Vectors in R^n
4	Vector Space
5	Linear Transformation
6	Vector differential Calculus
7	Vector Integral Calculus

Total hours (Theory): 64
Total hours (Tutorial): 16
Total hours: 80

Detailed Syllabus

Unit No	Topics	Lectures (Hours)	Weight age
1	**Matrix Theory and Application of Matrices:** Definition and Special Types of matrices**,** Determinant, Rank, Inverse, Row Echelon Form and Reduce Row Echelon Form, Homogeneous and nonhomogeneous System of linear equation, Caley-Hamilton Theorem, **Applications:** Solution of System of linear equations, Linear dependence and Linear Independence.	11	15%
2	**Vectors in R^n :** Norm, Distance ,properties of vectors, angle between vectors, Pythagorean thereom and Cauchy-Schwartz inequality in R^n	03	05%
3	**Vector Space**: Definition, Subspace, Linear Combination, Linear dependence and Linear Independence of vectors, Span, Basis, Reduction and Extension to Basis, Dimension, Change of Basis, Rank Nullity Theorem Column space, Row space and Null space.	12	20%
4	**Linear Transformation:** Definition, Basic Properties, Linear Transformation as Rotation, Reflection, Expansion, Contraction, Shear, Projection, Matrix of Linear transformations, Kernel, Range, Change of Basis and Similarity, Rank Nullity Theorem.	9	15%
5	**Eigen value and Eigenvector:** Definition, Properties, Diagonalization, Algebraic multiplicity, Geometric multiplicity, Similarity of Matrices. **Applications:** Quadratic form, Bilinear Form, Canonical Form.	10	15%
6	**Vector differential Calculus:** Tangent vector, normal vector, vector differentiation, Gradient, Curl, divergence and their geometrical meaning, Solenoidal vector, Irrotational vector, Conservative field.	09	15%
7	**Vector Integral Calculus:** line Integral, Surface integral, Volume Integral, Green's Theorem, Stokes Theorem and Gauss Divergence Theorem.	10	15%
	Total	64	100%

Instructional Method and Pedagogy:

- Two Faculties will be covering the syllabus in each branch for 5 hours in a week. In Tutorial, class must be divided into two subclasses & faculties will be solving or assigning the problem of the subject in each subclass.
- Attendance is compulsory in lectures and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 30 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 10 Marks.
- One internal exam of 30 marks is conducted as a part of internal theory evaluation.

Learning Outcome:

At the end of the course

- The students will be able to think logically and mathematically in any field of engineering.
- The students will gain an experience in the implementation of Mathematical concepts which are applied in various field of Engineering.

REFERENCE BOOKS/TEXT BOOK:

1. **Advance Engineering Mathematics** by E Kreyszig, 8th edition, Willey India.
2. **Elementary linear Algebra with Application** by H Anton, 9th edition, Willey India.
3. **Thomas Calculus** by M D Weir, Joel Hass and F R Giordano, 11th Edition, Pearson Education.
4. **Calculus** by T M apostol, Vol.II, 2nd Edition, Willey India. **Calculus** by T M apostol, Vol. I, 2nd Edition, Willey India.
5. **Single and Multivariable Calculus** by Hughes-Hallett, Gleason, Mccallum, 3rd Edition, John Willey and Son.

List of Tutorials

Sr. No	Tutorial Content
1	Assignments on "**Matrix Theory and Application of Matrices".**
2	Assignments on **"Vector in R^n".**
3	Problem solving on **"Vector Space".**
4	Problems solving on **"Linear Transformation".**
5	Assignments on **"Eigen value and Eigenvector and Applications".**
6	Assignments on **"Vector differential Calculus".**

7	Problem solving on **"Vector Integral Calculus".**