ELECTIVE – II - VECTOR ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
IV	21CMA4B	Elective-II	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Deal with the concepts about differentiation and integration of vectors.
- Improve the basic knowledge of applications of Vector analysis

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire the knowledge about dot and cross product of vectors	K2
CO2	Understand the terms directional derivative and conservative force field	K2
CO3	Demonstrate the vector identities	K3
CO4	Apply the concepts of surface and volume integral in real life in a effective manner	K3
CO5	Verify the Stoke's and Green's theorem	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	S	S	S	M
CO2	M	S	S	M	S	S
CO3	S	S	S	M	S	M
CO4	S	M	S	M	M	S
CO5	S	S	S	S	M	S

S- Strong: M- Medium: L- Low

UNIT – I - DIFFERENTIAL VECTOR CALCULUS   **12 Hours**

Differentiation of a Vector – Differentiation Formulae – Differentiation of dot and Cross products.

UNIT – II -GRADIENT, DIVERGENCE AND CURL   **12 Hours**

Definition of gradient, divergent and curl – Directional derivative – Equations of the tangent plane and normal line, solenoidal and irrotational vectors, conservative force field – simple problems.

UNIT – III- VECTOR IDENTITIES   **12 Hours**

Proof of Vector Identities - Simple problems using vector identities.

UNIT – IV- VECTOR INTEGRATION   **12 Hours**

The line integral, surface integral and volume integral with their physical meaning – Statement of Gauss theorem and simple problems.(without proof).

UNIT –V- VECTOR INTEGRATION (CONT.)   **12 Hours**

Statement of Stoke's and Green's theorem (without proof) – Simple problems.

DISTRIBUTION OF MARKS: THEORY 10% AND PROBLEMS 90%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R.Vittal	Vector analysis, Analytical solid geometry &sequences and series	Margham publications, Chennai	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.Balasubramanian and K.G.Subramanian	Ancillary Mathematics vol I&II	McGraw Hill, New Delhi	1997
2.	S.P.Rajagopalan and R.Sattananthan	Allied Mathematics	Vikaspublications,New Delhi	2005
3.	P.Duraipandian and S.Udayabaskaran	Allied Mathematics volume I & II	Muhilpublishers,Chennai	1977

WEB RESOURCES

1. https://www.whitman.edu/mathematics/calculus_online/chapter16.html
2. https://www.brighthubengineering.com/machine-design/74224-understanding-vector-analysis/

TEACHING METHODOLOGY

1. Class room Teaching

2. Assignments

3. Seminars

4. Discussions

5 .PPT Presentations

SYLLABUS DESIGNER

Dr. M. Kasthuri, Assistant Professor of Mathematics