

ELECTIVE – I - FOURIER ANALYSIS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21CMA3B	Elective I	Hrs/Week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Understand the basic concepts of Fourier series and Fourier transforms and will solve problems in these fields of study.
- Find solutions to the differential equations. The portion on Fourier Transforms will help the students to do research in pure and applied mathematics.

COURSE OUTCOMES:

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Derive Fourier series of a given periodic function by evaluating Fourier coefficients	K2
CO2	Understand the nature of Fourier series that represent odd and even functions	K2
CO3	Expand an odd or even function as a half-range cosine or sine Fourier Series	K3
CO4	Compute Fourier Transform of sine and cosine integrals	K2
CO5	Solve the problems using Convolution Theorem and Parseval's Identity	K3

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

MAPPING WITH PROGRAMME OUTCOMES:

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

S- Strong; M-Medium; L-Low

UNIT I: FOURIER SERIES**12 Hours**

Dirichlet's conditions - Euler's formulae - Functions having Discontinuity - Fourier series in the interval $(0, 2\pi)$ and $(-\pi, \pi)$.

UNIT II: FOURIER SERIES: (Contd.)**12 Hours**

Fourier Expansions of odd and even functions in the interval $(-\pi, \pi)$ - Change of interval - Fourier series in the interval $(0, 2l)$ and $(-l, l)$.

UNIT III :FOURIER SERIES: (Contd.)**12 Hours**

Half- range Sine and Cosine series - Typical wave forms - Parseval's identity.

UNIT IV :FOURIER TRANSFORMS:**12 Hours**

Definition – Fourier integrals – Fourier sine and cosine integrals – Fourier sine and cosine Transform – Simple Problems.

UNIT V : FOURIER TRANSFORMS: (Contd.)**12 Hours**

Properties of Fourier Transforms – Convolution Theorem for Fourier Transforms (without proof) – Parseval's Identity – Simple Problems.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS: 80%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	P.R.Vittal and V.Malini	Vector Calculus, Fourier Series and Fourier Transform	Margham Publications, Chennai	2004
2.	Dr. A. Singaravelu	Transforms and Partial Differential Equations	Meenakshi Agency	2013

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	S. Narayanan and T.K.Manicavachago mPillay	Calculus	S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai	2004
2.	B.S.Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi	2002
3.	G.B. Thomas and R.L.Finney	Calculus and Analytic Geometry	Wesley (9 th Edn), Mass. (Indian Print)	1998
4.	M.K.Venkataraman	Engineering Mathematics – Part B	National Publishing Company, Chennai.	1992

WEB RESOURCES

1. <https://www.doverpublications.com/Fourier Series>
2. <https://www.springers.com/Fourier Series>

TEACHING METHODOLOGY

1. Class room Teaching
2. Assignments
3. Seminars
4. Discussions
- 5.PPT Presentations

SYLLABUS DESIGNER

Mrs.R.Ramya, Assistant Professor of Mathematics.