DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
III	21CMA3A	Core Paper V	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			4	60	4	60		

COURSE OBJECTIVES:

The students will be able to

- Identify the type of a given differential equation and apply the appropriate analytical technique for finding the solution of first order and higher order ordinary differential equations.
- Find the Laplace Transform of specified functions and solve linear ordinary differential equation using Laplace Transforms.

COURSE OUTCOMES:

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

.		CO Statement	Knowledge Level (K1-K4)
CO1		Understand the different types of solvable equations	K2
CO2		Apply the method of undermined coefficients to solve the non-homogenous linear differential equations with constant coefficients	K2
CO3		Solve simultaneous equations	K3
CO4		Use the Laplace transform in finding the solution of linear differential equations	K3
CO5		Find the solution of first order linear partial differential equations using Lagrange's method	K2

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: ORDINARY LINEAR DIFFERENTIAL EQUATIONS   **12 Hours**

Equations of the First Order and Higher Degree: Equations Solvable for p, Equations Solvable for x and Equations Solvable for y – Clairaut's Equations, Equations of second order with Constant Coefficients.

UNIT –II: ORDINARY LINEAR DIFFERENTIAL EQUATIONS (CONTD.) 12 Hours

Equations of the Second Order: Euler's homogenous Linear Equations with Variable Coefficients – Legendre's Linear Equations (second order only) - Method of Variation of Parameters.

UNIT – III: DIFFERENTIAL EQUATIONS OF OTHER TYPES   **12 Hours**

Simultaneous Equations of first order – Total Differential Equations – Solving Pdx + Qdy+ Rdz = 0.

UNIT – IV: LAPLACE TRANSFORMS   **12 Hours**

Laplace Transform – Inverse Laplace Transform – Properties – Application of Laplace Transform to solution of first and second order Linear Differential equations (with constant coefficients)

UNIT – V: PARTIAL DIFFERENTIAL EQUATIONS   **12 Hours**

Formation of a PDE – Complete Integral - Particular Integral – Singular Integral, Equations, Solvable by direct Integration solving equations of the types: $f(p, q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = f(y, q)$, $z = px + qy + f(p, q)$ (Only standard types) -Lagrange's equations.

DISTRIBUTION OF MARKS: THEORY 20% AND PROBLEMS 80%

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Kandasamy. P &Thilagavathy. K	Mathematics for B.Sc Vol. III	S. Chand and Company Ltd., New Delhi -55	2004
2.	Narayanan. S &Manicavachagam Pillay. T K	Calculus	S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai	2004

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Raisinghania, M D	Ordinary and Partial Differential Equations	S. Chand and Company Ltd., New Delhi -55	2001
2.	Spiegel, M R	Advanced Mathematics for Engineers and scientists	Tata McGraw Hill edition, New Delhi	2005
3.	Spiegel, M R	Laplace Transforms	Tata McGraw Hill edition, New Delhi	2005
4.	Sudha, S	Differential Equations and Integral Transforms	Emerald Publishers, Chennai	2003
5.	Venkataraman, M K	Higher Engineering Mathematics	III – B, National Publishing Co., Chennai.	1998
6	Vittal, P R	Differential Equations and Laplace Transform	Margham Publishers, Chennai	2004
7.	Grewal, B S	Higher Engineering Mathematics	Khanna Publishers, New Delhi	2002
8.	Ross, S L	Differential Equations, III Edition	John Wiley and Sons, New York	1984

WEB RESOURCES

1.https://www.schandpublishing.com/books/higher-education/mathematics/ordinary-partial-differential-equations/9789352535866/#.XfnJdmQzYdU
 2.https://www.sapnaonline.com/general-search?searchkey=Differential_Equations_and_Integral_Transforms+by+s+sudha

TEACHING METHODOLOGY

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

SYLLABUS DESIGNER

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