



**Department of Applied Science & Humanities-II**

**LESSON PLAN**

**Session: Jan – May 2026**

**Semester: 2<sup>nd</sup>**

**Name:** \_\_\_\_\_

**University Roll Number:** \_\_\_\_\_

**BUDDHA INSTITUTE OF TECHNOLOGY**

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# BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF APPLIED SCIENCE & HUMANITIES-II

ACADEMIC YEAR 2025-26 (ODD Semester)

## LESSON PLAN

Semester: 2	Section: A (CSE)	Course Code: BAS 203	Contact Hours /week: 7
Course Name: Engineering Mathematics-2			# of credits:3
Teacher's Name: Dr. Binay Kumar Srivastava			Designation: Professor
Sessional Marks:30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:	
Basics of Differential Equation	10 +2

Content delivery methods:	Chalk & Board, Book
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### COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	<b>Ordinary Differential Equation of Higher Order:</b> Linear differential equation of nth order with constant coefficients, Simultaneous linear differential equations, Second order linear differential equations with variable coefficients, Solution by changing independent variable, Method of variation of parameters, Cauchy-Euler equation, Application of differential equations in solving engineering problems.	16	C01
2	<b>Laplace Transform:</b> Laplace transform, Existence theorem, Properties of Laplace Transform, Laplace transform of derivatives and integrals, Unit step function, Laplace transform of periodic function, Inverse Laplace transform and Convolution theorem.	16	C02

	Application of Laplace Transform to solve ordinary differential equations and simultaneous differential equations.		
3	<b>Sequences and Series:</b> Definition of Sequence and series with examples, Convergence of series, Tests for convergence of series, Ratio test, D' Alembert's test, Raabe's test, Comparison test. Fourier series, Half range Fourier sine and cosine series.	13	C03
4	<b>Complex Variable-Differentiation:</b> Functions of complex variable, Limit, Continuity and differentiability, Analytic functions, Cauchy- Riemann equations (Cartesian and Polar form), Harmonic function, Method to find Analytic functions, Milne's Thompson Method, Conformal mapping, Mobius transformation and their properties.	14	C04
5	<b>Complex Variable -Integration:</b> Complex integration, Cauchy- Integral theorem, Cauchy integral formula, Taylor's and Laurent's series, singularities and its classification, zeros of analytic functions, Residues, Cauchy's Residue theorem and its application.	14	C05

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

<b>C01</b>	Applying the basic mathematical concepts for solving differential equations of higher order
<b>C02</b>	Understand and apply the concept of Laplace Transform to evaluate differential equations.
<b>C03</b>	Understand the concept of convergence of sequence and series. Also evaluate Fourier series...
<b>C04</b>	Apply the concept of analyticity, Harmonic function and create the image of function applying conformal transformation.
<b>C05</b>	Apply the concept of Cauchy Integral theorem, Cauchy Integral formula, singularity and calculus of residue to evaluate integrals.

**Mapping of CO v/s PO:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>C01</b>	3	2	2	-	-	-	-	-	-	-	-	1
<b>C02</b>	3	2	2	-	-	-	-	-	-	-	-	1
<b>C03</b>	3	2	2	-	-	-	-	-	-	-	-	1
<b>C04</b>	3	2	2	-	-	-	-	-	-	-	-	1
<b>C05</b>	3	2	2	-	-	-	-	-	-	-	-	1
<b>Average</b>	3	2	2	-	-	-	-	-	-	-	-	1
					PSO1	PSO2	PSO3					

	<b>C01</b>			
	<b>C02</b>			
	<b>C03</b>			
	<b>C04</b>			
	<b>C05</b>			
	<b>Average</b>			

**Correlation levels: 1-Slight (Low)    2-Moderate (Medium)    3-Substantial (High)**

<b>Gap in the syllabus</b>	Elementary Approach
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<b>Topics to be covered beyond syllabus</b>	Some fundamentals on each topic.
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## LESSON PLAN

Lecture	Module	Scheduled			Conducted			
		Topic	*R BT Le vel s	C O M a p p i n g	Date	Topic	Date	N o . O f S t u d e n t s
1	I	Introduction	L2	CO 1				
2		Basic Concept of first order & first degree differential equation	L2					
3		Linear differential equation of nth order with constant coefficients	L2					
4		Complementary function and Particular Integral	L2					
5		Particular Integral, when $Q = e^{ax}$ , $x^m$ , m is positive integer	L2					
6		Particular Integral, when $Q = \sin ax$ or $\cos ax$ , $e^{ax}$ V	L2					
7		<b>Tutorial 1/Assignment 1</b>						
8		Particular Integral, when $Q = x^m$ V	L2					
9		Particular Integral, when $Q = \tan ax$ , $\sec ax$ , $\cot ax$ , $\operatorname{cosec} ax$ , etc.	L2					
10		Cauchy - Euler equation	L2					
11		Legendre's equation	L2					

12		<b>Doubt Clearing class</b>	L3	CO 2						
13		Simultaneous linear differential equation	L3							
14		Second order linear differential equations with variable coeff.	L3							
15		Solution by changing independent variable	L3							
16		Normal form	L3							
17		Method of variation of parameters	L3							
18		<b>Tutorial 2/Assignment 2</b>								
19	II	Laplace Transform & Existence Theorem	L3							
20		Properties of Laplace Transformation	L3							
21		<b>Doubt Clearing class</b>	L3							
22		<b>Tutorial 3/Assignment 3</b>								
23		Inverse Laplace Transform & Properties	L3							
24		Convolution Theorem with statement and Proof	L3							
25		Examples and Problems	L3							
26		Application of Laplace Transformation to solve ODE	L3							
27	Examples and Problems	L3								
28	Application of Laplace Transformation to solve Simultaneous diff Equations.	L3								
29	Examples and Problems	L3								

30		<b>Tutorial 4/Assignment 4</b>						
31	II I	Introduction on Sequence and Series with Examples	L3	CO 3				
32		Convergence of Series and Tests for Convergence of Series	L3					
33		Comparison and Ratio Test with Examples	L3					
34		D' Alembert's Test with examples	L3					
35		<b>Tutorial 5/Assignment 5</b>						
36		Problems	L3					
37		Change of Interval	L3					
38		Half Range Fourier Sine Series	L3					
39		<b>Doubt Clearing class</b>	L3					
40		Half range Fourier cosine series	L3					
41		Half range Fourier cosine series	L3					
42		<b>Tutorial 6/Assignment 6</b>						
43		I V	Introduction to Limit , Continuity, Differentiability of Complex variable functions with examples		L3			

44		Analytic Function with examples	L3	CO 4				
45		Nature of Bilinear Transformation	L3					
46		Doubt clearing class	L3					
47		Nature of Bilinear Transformation	L3					
48		Doubt clearing class	L3					
49		<b>Tutorial 7/Assignment 7</b>						
50		Cauchy – Riemann equations	L3					
51		Problem based on Cauchy – Riemann equations	L3					
52		<b>Doubt Clearing class</b>	L3					
53		Introduction to Conformal mapping	L3					
54		Nature of Bilinear Transformation	L3					
55		Problems	L3					
56		Problems	L3					
57		<b>Tutorial 8/Assignment 8</b>	L3					
58	V	Complex integration with examples	L3	CO 5				
59		Cauchy's theorem & Cauchy's integral formula	L3					
60		Taylor's series with example.	L3					

61	Liouville's theorem with example	L3					
62	<b>Tutorial 9/Assignment 9</b>						
63	Zeros and singularities of an analytic functions						
64	Methods of finding residues with examples	L3					
65	Cauchy's Residue Theorem and its application.	L3					
66	Problems based on calculus of residues.	L3					
67	Problems	L3					
68	Poles lies in unit circle	L3					
69	Poles lies on real axis	L3					
70	Doubt clearing class	L3					
71	Doubt clearing class	L3					
72	Poles lies in the upper half of the z-plane	L3					
73	Doubt clearing class	L3					
74	Doubt clearing class	L3					
75	<b>Tutorial 10/Assignment 10</b>	L3					
76	<b>Revision/Doubt Clearing</b>	L3					

<b>Sessional</b>	<b>Planned Syllabus</b>
CT	1-30
Pre-AKTU	Full Syllabus

**\*Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**Literature**

**Text Books: T1. Engg. Mathematics-II, N.P. Bali, University Science Press**

**T2. Introduction to Engg. Mathematics-II, H.K. Dass, S. Chand & Company Ltd.**

**Reference Books:**

**R1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.**

**R2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.**

**Faculty Sign**

**HOD's sign**