

ORISSA SCHOOL OF ENGINEERING & POLYTECHNIC
DEPARTMENT OF MATHEMATICS & SCIENCE
LESSON PLAN

Semester: 3rd Semester (2023-24)

Subject: Engineering Math-III (Theory)

Branch: E&TC Engg. + Electrical Engg.

Name of the faculty: PROF. MITHUN KUMAR SAHU

TOPIC / UNIT	CLASS	DATE	TOPIC TO BE TAUGHT
Complex Number System	1	02/07/23	Explain need for Complex Number System, Introduce $= \sqrt{-1}$. Differentiate real and imaginary no.
	2	03/07/23	Define $Z = a+ib$ form and explain the geometrical meaning of $Z, $ State and derive algebra of Z (Addition, Subtraction, Multiplication)
	3	04/07/23	State and apply division for Z Convert given expression into $a+ib$ form
	4	05/07/23	State and illustrate properties of $\bar{z}, $
	5	09/07/23	Determine the cube roots of unity $1, \omega, \omega^2$ and state their properties. Discuss polar form representation of $Z=a+ib$
	6	10/07/23	State and apply De-Moivre's theorem to find
	7	11/07/23	Evaluate square root of a complex number i.e. $\sqrt{a+ib}$ Discuss previous year problems from complex number system
Matrices	8	12/07/23	Define and illustrate different types of matrices.
	9	16/07/23	Define rank of the matrix. Evaluate Rank using Minor method
	10	18/07/23	Evaluate rank of a matrix by using elementary row and column operations
	11	19/07/23	State Rouché's Theorem Apply it to test consistency of a system of equations
	12	23/07/23	Solve a system of equations by backward substitution if it is consistent.
	13	23/07/23	Evaluate the unknown values λ and μ for the system of equation having (i) unique solution, (ii) infinite solution or (iii) no solution
	14	25/07/23	Discuss previous year problems on rank of matrices.
Differential Equations	15	26/07/23	Derive ODE from given function $f(x)$ Define homogeneous and non-homogeneous differential equations with constant coefficients.
	16	30/07/23	State the process for solving homogeneous ODEs of the form $F(D,y)=0$ i.e. the conditions for complementary function (CF) Illustrate examples when roots are (i) real & unequal, (ii) real & equal (iii) complex conjugate Solve problems for evaluating CFs
	17	31/07/23	State the process for solving non-homogeneous ODEs of the form $F(D,y)=g(x)$ i.e. the Complete Solution= CF+PI
	18	01/08/23	State and illustrate process of finding PI when (i) $g(x) = e^{ax}$, (ii) $g(x) = \cos ax$ or $\sin ax$
	19	02/08/23	State and illustrate process of finding PI when (iii) $g(x) = e^{ax} \cdot V(x)$

	20	06/08/23	Solve ODEs to evaluate complete solution.
	21	07/08/23	Define partial differential equations. State the rules for partial derivatives, define p, q, r, s, t . Derive PDE from a given equation of three variable, i.e. $Z = f(x, y)$
	22	08/08/23	Derive PDEs from $f(x, y, z) = 0$ and $F(u, v) = 0$, where u & v are function of x, y, z
	23	09/08/23	Define linear PDE, $Pp + Qq = R$ & illustrate the process of solving it
	23	13/08/23	Solve important PDEs Solve previous year questions from Differential Equations
	25	14/08/23	Define Gamma function $\Gamma(n)$, state its properties with applications
Laplace Transform- ation	26	16/08/23	Evaluate integrals using Gamma function. Define Laplace transformation of $f(t)$ i.e. and its existence condition
	27	20/08/23	State properties of Laplace transformation and formulae for transformation of standard function with examples.
	28	21/08/23	Using std. formulae, derive $L\{f(t)\}$ State and apply formula for $\left\{ \frac{()}{()} \right\} \{ \} \quad ()$
	29	22/08/23	State and apply Laplace transformation on derivatives and integrals.
	30	23/08/23	Find Laplace transformation of $f(x) = \sin t, \sin at, \cos bt$ type And $f(x) = b$ type functions and functions with points of discontinuity
	31	27/08/23	Solve some more examples on Laplace transformations.
	32	28/08/23	Define inverse Laplace transformations and state its formulae
	33	29/08/23	Derive $^{-1}\{ \} \}$ using standard formulae
	34	30/08/23	Define and illustrate process of partial fraction for all three cases
	35	03/09/23	Evaluate $^{-1}\{ \frac{0}{0} \}$ after simplifying the fraction by partial fraction method
	36	04/09/23	Solve some more problems on inverse Laplace of fraction
	37	05/09/23	Solve ODEs using $^{-1}\{ \} \}$ concept. Solve previous year problems on Laplace Transformation
	38	06/09/23	Define periodic function and its period with examples. State Dirichlet Condition for the Fourier series expansion and its convergence
	39	10/09/23	State Euler's formula for Fourier series i.e. formula for a_0, a_n, b_n
Fourier Series Transformations	40	11/09/23	Convert $f(x) = x$ and $f(x) = x^2$ into Fourier series by using the Euler's formula in $-\pi < x < \pi$
	41	12/09/23	Convert some continuous function into Fourier series by using the Euler's formula in $-\pi < x < \pi$ and $0 < x < 2\pi$
	42	13/09/23	Convert functions with points of discontinuity into Fourier series

	43	17/09/23	Define Odd and Even function and state the process of finding their half series
	44	18/09/23	Solve some more problems in Fourier series from previous year question papers
	45	19/09/23	State the limitations of analytical method of solving and explain the evolution and advantages of numerical methods. Define significant digits and calculation error
	46	20/09/23	Introduce iterative method and state the steps and procedure for Bisection method with example
Numerical Analysis	47	23/09/23	State the steps and procedure for Newton Raphson's method with example
	48	25/09/23	Solve an equation using both the methods and compare the efficiency of methods.
	49	26/09/23	Introduce finite difference operators Δ , E , and backward delta and establish relationship between them Evaluate nth difference for $f(x)$ both forward and backward
	50	27/09/23	Formulate forward and backward table for calculating missing values in data table.
	51	01/10/23	Define interpolation. For equal interval, define Newton's forward and backward interpolation formula with illustrative examples.
	52	03/10/23	Use forward and backward interpolation formula for finding $f(x)$ at $x=a$ from given data table.
	53	04/10/23	State Lagrange's interpolation formula for unequal intervals. Use it for a set of data.
	54	15/10/23	Formulate suitable polynomial for specific data table.
	55	17/10/23	Explain Numerical integration and its benefit State and apply Newton-Cote's formula, Trapezoidal rule
	56	18/10/23	Apply and Simpson's $1/3^{\text{rd}}$ rule with illustrative examples
	57	22/10/23	Use both Trapezoidal rule and Simpson's $1/3^{\text{rd}}$ rule on an integral with different step value
	58	23/10/23	Solve previous year problems on Numerical Analysis.
	59	23/10/23	Revision Ch 1
	60	25/10/23	Revision Ch 2
	61	29/10/23	Revision Ch 2
	62	30/10/23	Revision Ch 3
	63	01/11/23	Revision Ch 3
	64	05/11/23	Revision Ch 4
	65	06/11/23	Revision Ch 5
	66	07/11/23	Revision Ch 6
	67	08/11/23	Revision Ch 6

P. H. K. Kumar Sharma


H.O.D. Electrical Deptt.
O.S.E., Berhampur


Principal
Orissa School of Engineering
Berhampur (Gm.)