



GOVERNMENT POLYTECHNIC KANDHAMAL

LESSON PLAN FOR MATHEMATICS-I

(Course Code-TH 3)

WINTER-2025

DEPARTMENT: Mathematics & Science	SEMESTER: 1ST	NAME OF THE FACULTY TEACHING: Sri Nirakara Bag, Lecturer stage-I, Mathematics
SUBJECT: Engg. Mathematics (TH 3)	TOTAL PERIOD: 60	CREDIT: 4
DURATION OF END SEM EXAM: 3 Hours	PERIOD PER WEEK: 4	IA: 30 MARKS END SEM EXAM: 70 MARKS

Semester From Date: 06-08-2025 to Date: 14-12-2025

LESSON PLAN AND COURSE STRUCTURE

Week	Day	Topic to be covered
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UNIT I – Trigonometry

Week 1	Day 1	Introduction to Trigonometry and Concept of Angle
	Day 2	Degrees, Radians, Grades & Their Conversions
	Day 3	T-Ratios of Allied Angles (without proof)
	Day 4	Sum and Difference Formulas and Their Applications

Week 2	Day 5	Product-to-Sum and Sum-to-Product Formulas
	Day 6	Transformation of Products
	Day 7	T-Ratios of Multiple Angles (2A, 3A)
	Day 8	T-Ratios of Sub-Multiple Angles (A/2)

Week 3	Day 9	Graphs of $\sin x$ and $\cos x$
	Day 10	Graphs of $\tan x$ and e^x
	Day 11	Practice: Graphs & Identities
	Day 12	Unit I Revision & Test

UNIT II – Differential Calculus

Week 4	Day 13	Definition of Function
	Day 14	Concept of Limit
	Day 15	Standard Limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$ $\lim_{x \rightarrow 0} \frac{\sin x}{x}$
	Day 16	Standard Limits $\lim_{x \rightarrow a} \frac{a^x - 1}{x}$ $\lim_{x \rightarrow a} (1 + x)^{\frac{1}{x}}$

Week 5	Day 17	Limit Practice Problems
	Day 18	Concept of Differentiation by Definition

	Day 19	Derivatives of $e^x, \sin x, \cos x$
	Day 20	Derivatives of $\tan x, e^{x \log x}$
Week 6	Day 21	Sum, Product & Quotient Rule
	Day 22	Chain Rule – Function of a Function
	Day 23	Trigonometric & Inverse Trig Derivatives
	Day 24	Unit II Revision & Test

UNIT III – Algebra

Week 7	Day 25	Complex Numbers: Real & Imaginary Parts
	Day 26	Polar & Cartesian Form and its conversion
	Day 27	Recall Conversion, Modulus, Amplitude (Argument)
	Day 28	Conjugate, Addition, Subtraction, Multiplication, Division
Week 8	Day 29	De-Moivre's Theorem
	Day 30	Application of De-Moivre's Theorem
	Day 31	Introduction to Partial Fractions
	Day 32	Proper Fractions: Non-repeated Linear Factors
Week 9	Day 33	Repeated & Quadratic Factors
	Day 34	Improper Fractions to Partial Fractions
	Day 35	Mixed Problem Practice
	Day 36	Unit III Revision & Test

UNIT IV – Permutations, Combinations & Binomial Theorem

Week 10	Day 37	Introduction to Permutations
	Day 38	$P(n,r)$: Formula and Problems
	Day 39	Introduction to Combinations
	Day 40	$C(n,r)$: Formula and Problems
Week 11	Day 41	Mixed Practice – P & C
	Day 42	Binomial Theorem (Positive Integral Index)
	Day 43	General and Middle Term
	Day 44	Expansion for Any Index (without proof)
Week 12	Day 45	First & Second Binomial Approximation
	Day 46	Applications to Engineering Problems

	Day 47	Mixed Practice
	Day 48	Unit IV Revision & Test
Final Review & Mock Exams		
Week 13	Day 49	Trigonometry – Final Review
	Day 50	Differential Calculus – Final Review
	Day 51	Algebra – Final Review
	Day 52	P & C & Binomial – Final Review
Week 14	Day 53	Mock Test 1 – Part A (Units I & II)
	Day 54	Discussion of Mock Test 1
	Day 55	Mock Test 2 – Part B (Units III & IV)
	Day 56	Discussion of Mock Test 2
Week 15	Day 57	Full Syllabus – Summary
	Day 58	Quick Formulas & Key Tricks
	Day 59	Final Doubts & Preparation
	Day 60	Grand Test (Full Syllabus)

Recommended Book

1. Dr. Deepak Singh, Mathematics-I (Downloaded from: <https://ekumbh.aicte-india.org/dbook.php>)

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