

Koyana Education Society's
Balasaheb Desai College, Patan
Monthly Teaching Plan
2023-2024

Subject Name: Mathematics

Class: B. Sc-I

Paper Name: Multivariable calculus & algebra

Month: Jan-24

Date	Unit/Subunit	Teaching Method
01/01/24	Lagrange's method of undetermined multipliers	Lecture
02/01/24	Examples on Lagrange's method of undetermined multipliers	Problem solving
03/01/24	Examples on Lagrange's method of undetermined multipliers	Problem solving
04/01/24	Jacobian-Definition & examples	Lecture
07/01/24	Examples on Jacobians	Problem solving
08/01/24	Proof of $J.J'=1$ for functions of two & three variables	Lecture
09/01/24	Jacobian of Composite function (for two & three variables)	Lecture
10/01/24	Examples on above two articles	Problem solving
11/01/24	Jacobian of implicit function & examples	Problem solving
	Paper IV Algebra Unit I Functions, divisibility & Congruence	
12/01/24	Concept of Sets, its types	Lecture
13/01/24	Operations on sets	Lecture
14/01/24	Examples on sets	Problem solving
15/01/24	Concept of Relation & its types	Lecture
16/01/24	Equivalence relation	Lecture
17/01/24	Examples on relations	Problem solving
18/01/24	Examples on relations	Problem solving
19/01/24	Equivalence classes & partitions	Lecture
20/01/24	Examples on equivalence classes & partitions	Problem solving
23/01/24	Concept of function & its types	Lecture
24/01/24	Examples on function & its types	Problem solving
25/01/24	Examples on function & its types	Problem solving
27/01/24	The induction Principle & strong induction Principle	Lecture
29/01/24	Examples on mathematical induction	Induction method
30/01/24	Divisibility & congruence	Lecture
31/01/24	Division algorithm: Theorem & its applications	Lecture


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2023-2024

Subject Name: Mathematics

Class: B. Sc-II

Paper Name: Integral calculus & Vector calculus

Month: Jan-24

Date	Unit/Subunit	Teaching Method
01/01/24	Surface integral, flux & examples	Lecture
02/01/24	Volume integral & examples	Problem solving
03/01/24	Green's theorem in a plane & examples	Problem solving
04/01/24	Green's theorem in a plane in vector notation & examples	Lecture
07/01/24	Statement of Gauss divergence theorem	Problem solving
08/01/24	Statement of Stoke's theorem & examples	Lecture
09/01/24	Line integral independent of path	Lecture
10/01/24	Irrotational & solenoidal vector fields	Problem solving
11/01/24	Physical interpretation of curl & div.	Problem solving
	Paper IV Integral Calculus Unit 1 Gamma & Beta functions	
12/01/24	Definition of gamma function & examples	Lecture
13/01/24	Properties of gamma function	Lecture
14/01/24	Properties of gamma function	Problem solving
15/01/24	Examples on properties of gamma function	Lecture
16/01/24	Definition of beta function & examples	Lecture
17/01/24	Properties of beta function	Problem solving
18/01/24	Properties of beta function	Problem solving
19/01/24	Properties of beta function	Lecture
20/01/24	Properties of beta function	Problem solving
23/01/24	Duplication formula of gamma function	Lecture
24/01/24	Examples on duplication formula	Problem solving
25/01/24	Examples on properties of gamma function	Problem solving
27/01/24	Examples on properties of gamma function	Lecture
29/01/24	Examples on properties of gamma function	Induction method
30/01/24	Examples on properties of gamma function	Lecture
31/01/24	Examples on properties of gamma function	Lecture


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2023-2024

Subject Name: Mathematics

Class: B. Sc-III

Paper Name: Complex Analysis & D. M. S.

Month: Jan-24

Date	Unit/Subunit	Teaching Method
01/01/24	Laurant's series	Lecture
02/01/24	Examples on Laurant's series	Problem solving
03/01/24	Absolute & uniform convergence of power series	Problem solving
04/01/24	Isolated singular points, Residues, Cauchy's Residue theorem	Lecture
07/01/24	Examples on Cauchy's Residue theorem	Problem solving
08/01/24	Three types of isolated singularities, Residues at pole & examples	Lecture
09/01/24	Zeros of analytic function, zeros & poles	Lecture
10/01/24	Applications of residue theorem to evaluate real integrals	Problem solving
11/01/24	Examples on evaluation of real integrals	Problem solving
	Paper XVI Discrete Mathematics Unit 1-Mathematical Logic	
12/01/24	Definition of statement, compound statement	Lecture
13/01/24	Truth values	Lecture
14/01/24	Logical equivalence, tautologies & contradiction	Lecture
15/01/24	Examples on tautologies & contradiction	Problem solving
16/01/24	Examples on tautologies & contradiction	Problem solving
17/01/24	Logical equivalences involving implication, negation	Problem solving
18/01/24	Examples on above article	Problem solving
19/01/24	The contrapositive of a conditional statement, converse, inverse of a conditional statement, biconditional statement	Lecture
20/01/24	Examples on contrapositive of a conditional statement, converse, inverse of a conditional statement, biconditional statement	Problem solving
23/01/24	Valid & invalid arguments	Lecture
24/01/24	Modus Ponens & modus Tollens	Problem solving
25/01/24	Additional valid argument forms	Problem solving
27/01/24	Rules of inference	Lecture
29/01/24	Contradiction and valid arguments	Induction method
30/01/24	Number system: addition & subtraction of binary numbers	Lecture
31/01/24	Conversion of decimal to binary & viceversa	Lecture


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Teaching Plan

2023-2024

Subject Name – Mathematics

Class-B.Sc. III

Paper Name –Linear Algebra
January

Month –

Name of the teacher: Miss N. G. Nalawade

Date	Unit / Subunit	Teaching Method	
20/01/2024	Unit 1: Vector Spaces and Linear Transformations #Vector space - definition of Vector space and its examples.	Lecture	
23/01/2024	Theorem: In any vector space (F) the following results hold: (i) $0 \cdot x = 0$ (ii) $\alpha \cdot 0 = 0$ (iii) $(-\alpha)x = -(\alpha x) = \alpha(-x)$ (iv) $(\alpha - \beta)x = \alpha x - \beta x$ where $\alpha, \beta \in F$ and $x \in V$. # Subspace - Definition of Subspace.	Lecture	
24/01/2024	Theorem: A necessary and sufficient condition for a non-empty subset W of a vector space (F) to be a subspace is that W is closed under addition and scalar multiplication. Theorem: A non-empty subset W of a vector space (F) is a subspace of V if and only if $\alpha x + \beta y \in W$ for $\alpha, \beta \in F$, $x, y \in W$.	Lecture	
25/01/2024	Proposition: Intersection of two subspaces is a subspace. Proposition: Union of two subspaces is a subspace if and only if one of them is contained in the other. Definition of Sum of subspaces. Proposition: Sum of two subspaces is a subspace.	Lecture	
27/01/2024	Definition of direct sum . Theorem: $V = W_1 \oplus W_2$ if and only if $V = W_1 + W_2$, $W_1 \cap W_2 = \{0\}$. Quotient space: Definition	Lecture	
29/01/2024	Homomorphism or Linear transformation- Definition of Homomorphism (or Linear transformation), isomorphism and their examples. Theorem: Under a homomorphism $T: V \rightarrow U$, (i) $T(0) = 0$ (ii) $T(-x) = -T(x)$. Definition of Kernel and Range of homomorphism. Examples.	Lecture and Problem solving	
30/01/2024	Theorem: Let $T: V \rightarrow U$ be a homomorphism, then $\text{Ker } T$ is a subspace of V . Theorem: Let $T: V \rightarrow U$ be a homomorphism, then $\text{Ker } T = \{0\}$ if and only if T is one – one. Theorem: Let $T: V \rightarrow U$ be a L.T. (linear transformation) then range of T is a subspace of U . Statement and proof of Fundamental Theorem of homomorphism.	Lecture and Problem solving	

31/01/2024	Theorem: If A and B are two subspaces of a vector space (F) , then $(A + B)/A \cong B/(A \cap B)$. Corollary: If $A + B$ is direct sum then $A/(0) \cong (A \oplus B)/B$. Theorem: Let W be a subspace of V , then there exists an onto L.T. $\theta: V \rightarrow V/W$ such that $\text{Ker } \theta = W$.	Lecture and Problem solving	
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