Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S.P. Patankar

Programme - B. Sc. I (Div-A and B) Semester - I

Subject: Mathematics Course Title: Differential Calculus - I

<table>
<tr><td colspan="3">Month: July</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Higher Order Derivative</td><td rowspan="2">1. Successive Differentiation
2. Leibnitz Theorem
3. Partial Differentiation, Chain rule</td></tr>
<tr><td>12</td><td>06</td><td>18</td></tr>
<tr><td colspan="3">Month: August</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Higher Order Derivative</td><td rowspan="2">1. Euler's Theorem on Homogeneous function
2. Maxima and Minima for function of two variable
3. Lagrange's method of undetermined multipliers</td></tr>
<tr><td>12</td><td>05</td><td>17</td></tr>
<tr><td colspan="3">Month :September</td><td>Module/Unit: III</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Tracing of Curves and its Rectification</td><td rowspan="2">1. Definition of Tangents, Normal, Curvatures, Asymptotes
2.Procedure for tracing of curve given in cartesian form
3. Commom curves</td></tr>
<tr><td>12</td><td>06</td><td>18</td></tr>
<tr><td colspan="3">Month : October</td><td>Module/Unit: IV</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Tracing of Curves and its Rectification</td><td rowspan="2">1. Parametric representation of curves and tracing of parametric curves
2. Parametric representation of curves and tracing of polar curves
3. Rectification of the curves</td></tr>
<tr><td>12</td><td>04</td><td>16</td></tr>
</table>

Name and Signature of Teacher

(Mr. S.P. Patankar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416003

(Prof. S.P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B.Sc. III

Semester - V

Subject: Mathematics

Course Title: Partial Differential Equations

Month July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Partial Differential Equation of order one	1. Partial differential Equation, Order of the Partial differential equation, Degree of the Partial differential equation 2. Derivation of a partial differential equation by the elimination of arbitrary constants. 3. Derivation of a partial differential equation by the elimination of arbitrary functions. 4. Lagrange's Linear Partial Differential Equation, method of solving the linear partial differential equation of order one. 5. Working Rule for Solution of Langranges linear Partial differential equation. 6. Geometrical Interpretation of Langranges linear partial differential equation.
12		12		
Month August			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Non- Linear Partial Differential Equation of order one	1. Explanation of the terms: i) Non linear partial differential equation. ii) Solution or Integral of a partial differential equation. iii) Complete Integral. iv) Particular Integral. v)General Integral. vi) Singular Integral. 2. Special Methods of Solutions applicable to some standard forms. Standare Form I and Standard Form II 3. Standard Form III and Standard Form IV 4. General Method of Solving equations of order one but of any degree : Charpit's Method. 5. Working Rule for Charpit's Method
12		12		
Month :September			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Linear Homogeneous Partial Differential Equations with Constant Coefficients	1. Explanation of the terms i)Linear partial differential equation of order n. ii) Solution of Linear Partial differential equation. iii) Linear Homogeneous Partial differential equation with constant coefficients. 2. Solution of linear homogeneous partial differential equation with constant coefficients 3. Methods for finding the complementary functions (C.F) 4. Methods for finding the particular Integrals (P.I). 5. General method for finding particular Integral.
12		12		
Month : October			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Non-Homogeneous Partial Differential Equations with Constant Coefficients	1. Definition of Non – homogeneous linear partial differential equation with constant coefficients and Solution of non homogeneous partial differential equation 2. Solution of the equation (D – m D ′ – K) z = 0 3. Methods for finding the complementary function (C.F) of a non homogeneous equation 4. Methods for finding particular Integral (P.I) of non homogeneous linear equations with constant coefficients Case 1 and Case 2 5. Case 3 and Case 4 6. Equations reducible to linear form with Constant coefficients.
12		12		

Name and Signature of Teacher

S. P. Patankar

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(S.P.Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B.Sc. III

Semester - V

Subject: Mathematics

Course Title: Numerical Method - I

Month July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Non Linear Equations	1. Introduction: Polynomial equation, algebraic equation and their roots 2. iterative methods, Bisection method, algorithm, examples 3. Secant algebraic method: iterative sequence of secant method, examples 4. Regula-Falsi method: algorithm, graphical representation, examples. 5. Newton's method: algorithm, examples.
12		12		
Month August			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	System of Linear Equations: Exact Method	1. Introduction: System of linear equations as a vector equation Ax = b,Augmented matrix. 2. Direct methods: Gauss elimination method: Procedure, Examples 3. Gauss-Jordan method: Procedure, examples. 4. Iterative methods:General iterative rule
12		12		
Month : September			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	System of Linear Equations : Iterative Methods	1. Jacobi iteration scheme, examples. 2. Gauss-Seidel method: Formula, examples.
10		10		

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Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B. Sc. I (Div – A and B) Semester - II

Subject: Mathematics Course Title: Differential Equations - I

Month: December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Differential Equations of First Order and First Degree:	Exact Differential Equations: 1) Necessary and Sufficient condition for exactness. 2) Working Rule for solving an Exact Differential Equation. 3) Integrating Factors: 4)Integrating Factor by Inspection and examples. 5) Integrating Factor by using Rules (Without Proof) and examples.
12	06	18		
Month : January			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Differential Equations of First Order But Not of First Degree	1)Equations solvable for p: Method and Problems. 2) Equations solvable for x: Method and Problems. 3) Equations solvable for y: Method and Problems. 4) Clairaut's Form: Method and Problems. 5) Equations Reducible to Clairaut's Form.
12	05	17		
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Linear Differential Equations With Constant Coefficients: f(D)y=X	1) General Solution. 2)Determination of Complementary Function. 3) Determination of Particular Integral. 4) General Method of Getting P.I. 5) Short Methods of Finding P.I. when X is in the form sin ax, cos ax, x(m being a Positive Integer), eV, x V where V is a function of x.
12	06	18		
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Homogeneous Linear Differential Equations (The Cauchy-Euler Equations)	1) Method of Solution.. 2) Legendre's Linear Equations. 3) Method of Solution of Legendre's Linear Equations.
12	04	16		

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B.Sc. III

Semester - VI

Subject: Mathematics

Course Title: Complex Analysis

Month: December			Module/Unit: I	Sub-units planned
Lectures	Practical	Total	Analytic Function	1. limit continuity of a function of a complex variable and complex valued function. 2. Differentiability and continuity and elementary rules of Differentiation with Analytic function and Analytic function in domain. 3. Necessary and sufficient condition for F(z) = u+iv to be Analytic and examples. 4. Limit of a sequence of complex numbers, Polar form of Cauchy- Riemann Equation. 5. Harmonic function, conjugate harmonic function, Construction of Analytic function. 6. Solved problems related to the test of analyticity of functions and construction of analytic function.
13		13		
Month: January			Module/Unit: II	Sub-units planned
Lectures	Practical	Total	Complex Integration	1. Elementary Definitions, Complex line integral, Integral along oriented curve and examples 2. Cauchy's integral theorem and its consequences, Cauchy's integral formula for multiply connected domain and its examples. 3. Jordan curve, orientation of Jordan curve, Simple connected and multiply connected domain. 4. Rectifiable curve and their properties. 5. Higher order derivative of an analytic function. 6. Development of an analytic function as a power series (a) Taylor's theorem for complex function. (b) Examples on Taylor's and Laurent series.
20		20		
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practical	Total	Singularities And Residues	1. Zeros of an analytic function, singular point, Different types of singularity, poles and zeros are isolated. 2. Limiting point of zeros and poles, Residue theorem, residue at a pole and residue at infinity. 3.Cauchy's residue theorem, Computation of residue at a finite pole 4. Integration round unite circle, Jordan's lemma 5. Evaluation of Integrals when f(z) has no poles on the real line when poles on the real line.
10		10		
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practical	Total	Entire Monomorphic Functions	1. Definition of entire and meromorphic functions. (a) Characterization of polynomials as entire functions (b) Characterization of rational functions as meromorphic functions. 2. Mittag Leffler's expansion Rouche's theorem and solved problems. 3. Some theorems on poles and singularities
09		09		

Name and Signature of Teacher

(Mr. S. P. Patankar)

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B.Sc. III Semester - VI

Subject: Mathematics Course Title: Numerical Method - II

<table>
<tr><td colspan="3">Month: January</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Interpolation : Equal Interval</td><td rowspan="2">1. Forward interpolation: Newton's forward differences, forward difference table. Newton's forward form of interpolating polynomial (formula only) examples
2. Backward interpolation: Newton's backward differences, backward difference table, Newton's backward form of interpolating polynomial (formula only).</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
<tr><td colspan="3">Month February</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Interpolation: Unequal Interval</td><td rowspan="2">1. Introduction, Lagrangian interpolating polynomial (formula only), examples
2. Divided difference interpolation:, Newton's divided differences, divided difference table, examples finding divided (differences of given data)
3. Newton's divided difference form of interpolating polynomial, examples</td></tr>
<tr><td>10</td><td></td><td>10</td></tr>
<tr><td colspan="3">Month : March</td><td>Module/Unit: III</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Numerical Differentiation and Integration</td><td rowspan="2">1. Numerical differentiation based on interpolation polynomial.
2. Numerical integration: Newton-Cotes formula (statement only)
3. composite Trapezoidal rule
4. composite Simpson's 1/3rd rule, examples
5. composite Simpson's 3/8th rule,examples.</td></tr>
<tr><td>18</td><td></td><td>18</td></tr>
</table>

Name and Signature of Teacher

(S.P. Patankar)

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(S.P. Patankar)
HEAD
Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B. Com I

Semester - I

Subject: Mathematics

Course Title: Business Mathematics Paper I

Month: July			Module/Unit: I/II	Sub-units planned
Lectures	Practicals	Total	1. Arithmetic and geometric progression 2. Compound interest, ratio, percentage, proportion and partnership	1. Definitions of A.P. 2. Definitions of G.P. 3. Formulae for nth term and sum to n terms of A.P. and G.P. 4. Simple examples. 5. Different types of interest rates 6. Simple examples on simple interest and compound interest.
15	00	15		
Month : August			**Module/Unit: II**	**Sub-units planned**
Lectures	Practicals	Total	Compound interest, ratio, percentage, proportion and partnership	1.Introduction to ratio and percentage 2. simple problems on ratio and percentage 3. Concept of proportion 4. Simple problems on proportion 5. Applications to division into proportional part and partnership
17	00	17		
Month : September			**Module/Unit: III**	**Sub-units planned**
Lectures	Practicals	Total	Matrices and Determinants	1. Definition of a matrix, types of matrices 2. Algebra of matrices 3. Adjoint of a matrix, Finding inverse of a matrix by using adjoint matrix. 4. Properties of determinants (without proofs) 5. Solutions of system of linear equations by Crammer's Rule.
17	00	17		
Month : October			**Module/Unit: IV**	**Sub-units planned**
Lectures	Practicals	Total	Linear programming problems (L.P.P.) and Transportation problems -	1. Formation of L.P.P. Graphical method of solution 2. Problems relating to two variables including the case of mixed constraints, cases having no solution, multiple solutions, unbounded solutions. 3. Definition of Transportation model 4. Formulation and solution of transportation model, NorthWest Corner rule
11	00	11		

Name and Signature of Teacher

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Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. S. P. Patankar

Programme - B. Com I

Semester - II

Subject: Mathematics

Course Title: Business Mathematics Paper II

Month : December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Functions of real variable, Limit of function and continuity	1. Linear, Quadratic, exponential (of type $y = a^x$) 2. Inverse functions and their graphs. illustrative examples. 3. Limits of a functions- Theorems on limit (without proof) 4. simple examples. 5. Continuity of a functions at a point, discontinuity of a function 6. Algebra of continuous functions, continuity at domain of a function, continuity of some standard function and related examples.
17	00	17		
Month : January			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Differentiation	1. Definition, derivative using first principle 2. Method of differentiation of sum, difference, product and quotient of two functions 3. Derivative of composite, inverse, exponential, logarithmic, parametric and implicit functions 4. Second order derivative
16	00	16		
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Applications of differentiation	1. Maxima and minima 2. Case of one variable involving second order derivative 3. Average cost, average revenue functions 4. Marginal cost, marginal revenue 5. Elasticity of demand
14	00	14		
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Integrations and its applications	1. Integration-An Anti-derivative process 2. Method of integration by substitution and by parts. 3. Definite integral And their properties.
13	00	13		

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - B. Sc. I (Div - A and B) Semester - I

Subject: Mathematics Course Title: Differential Calculus - II

Month: July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Mean Value Theorem and Indeterminate Forms	1. Rolle's Theorem 2.Lagrange's Mean Value Theorem 3.Cauchy Mean value theorem
12	04	16		
Month: August			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Mean Value Theorem and Indeterminate Forms	1. Taylor's Theorem 2.Maclaurin's theorem 3.Maxima and minima functions 4. Indeterminate forms 5. L' Hospital Rule
12	05	17		
Month : September			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Limit and Continuity of real valued functions	1.Definition of limit of function 2. Continuous function and their properties 3.Classification of discontinuities
12	06	18		
Month : October			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Limit and Continuity of real valued functions	1.Differentiability at a point, Left hand derivative, Right hand derivative 2.Differentiability in the interval [a, b] 3.Theorems on continuity
12	05	17		

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

(Prof. S.P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T Sutar

Programme - B. Sc. II

Semester - III

Subject: Mathematics

Course Title: Differential Calculus

<table>
<tr><td colspan="3">Month: July</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Limit And Continuity of Real Valued Functions:</td><td rowspan="2">1. Definition of limit of a real-valued function
2. Limit at infinity and infinite limits
3. Definition: Continuity at a point and Continuous functions on interval and their properties
4. Classification of Discontinuities (First and second kind)
5. Uniform continuity and sequential continuity and differentiability at a point ,left and right hand derivative, differentiability in the interval [a,b].</td></tr>
<tr><td>13</td><td></td><td>13</td></tr>
<tr><td colspan="3">Month : August</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Jacobian :</td><td rowspan="2">1. Definition of Jacobian and examples.
2. Properties of Jacobian.
3. Examples on the properties.</td></tr>
<tr><td>10</td><td></td><td>10</td></tr>
<tr><td colspan="3">Month : September</td><td>Module/Unit: III</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Extreme Values :</td><td rowspan="2">1. Definition of Maximum, Minimum and stationary values of function of two variables.
2.Conditions for maxima and minima and examples
3. Lagrange's method of undetermined multipliers of three variables and its example</td></tr>
<tr><td>11</td><td></td><td>11</td></tr>
<tr><td colspan="3">Month : October</td><td>Module/Unit: IV</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Vector Calculus :</td><td rowspan="2">1 . Differentiation of vector.
2.Tangent line to curve, Velocity and Acceleration.
3.Gradient, Divergence and Curl: Definitions and examples 4.Solenoidal and Irrotational Vector. Conservative vector Field.
5.Properties of Gradient Divergence and Curl</td></tr>
<tr><td>11</td><td></td><td>11</td></tr>
</table>

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

(Prof. S.P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - B.Sc. III

Subject: Mathematics

Semester - V

Course Title: Real Analysis

Month: July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Sets and Functions	1. Definition of Cartesian product, Function, Extension and restriction of functions 2. Onto function and its important theorems 3. Real valued functions 4. Equivalence and Countability 5. Real Numbers and Least Upper bounds
5		5		
Month: July – August			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Sequence and Series	1. Definition of Sequence and subsequence 2. Convergence, Divergence, Bounded sequences 3. Monotone Sequences with important theorems 4. Limit superior and Limit Inferior Cauchy sequence and It's Summability 5. Introduction and definition of Series of Real numbers 6. Series whose terms form a non-increasing sequence and summation by parts 7. Summability of series and Lass of ℓ^2
21		21		
Month : September			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Riemann Integration	1. Riemann integrability & integrals of bounded functions over bounded intervals 2. Darboux Theorem and Lemmas , Equivalent definition of integrability and integrals. 3. Conditions for integrability, Particular classes of bounded integrable functions 4. Properties of integrable functions and Inequalities for an integral 5. Function defined by a definite integral and Theorems of Integral Calculus
11		11		
Month : October			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Improper Integration	1. Introduction and definition of Improper Integral with Test for convergence at the left end: positive integrand. 2. General test for convergence of the improper integral 3. Convergence at ∞, the integrand being not necessarily positive. 4. Tests for conditional convergence
10		10		

Name and Signature of Teacher

(Ms. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Mr. S. P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Mr. Sagar Sutar

Program: B.Sc. III

Semester: V

Subject: Mathematics

Coarse Title: Computational Mathematics Laboratory- V

Month: July			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Bisection Method
00	02	02		2) Secant Method
Month: August			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Newton's method
00	02	02		2) Gauss elimination method
Month: September			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Gauss-Jordan method
00	02	02		2) Jacobi iteration scheme
Month: October			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Gauss-Seidel method
00	02	02		2) Power method

Name and Signature of Teacher

(Mr. Sagar Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

(Mr.S. P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - B. Sc. I (Div- A and B)

Semester - II

Subject: Mathematics

Course Title: Differential Equations - II

Month: December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Second Order Linear Differential Equations:	1) Complete Solution when one Integral is known: Method and Examples. 2) Transformation of the Equation by changing the dependent variable(Removal of First order Derivative). 3) Transformation of the Equation by changing the independent variable. 4) Method of Variation of Parameters.
12	06	18		
Month: January			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Ordinary Simultaneous Differential Equations and Total Differential Equations	1)Methods of Solving simultaneous Linear Differential Equations. 2) Total (or Pfaffian) differential equations Pdx + Qdy + Rdz-0 3) Necessary condition for Integrability of total differential equation 4)The condition for exactness. 5)Methods of solving total differential equations: 6) Geometrical Interpretation of Ordinary Simultaneous Differential Equations
12	05	17		
Month : February			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Partial Differential Equations	1)Order and Degree of Partial Differential Equations 2) Linear and non-linear Partial Differential Equations 3) Classification of first order Partial Differential Equations 4)Formation of Partial Differential Equations by the elimination of arbitrary constants 5) Formation of Partial Differential Equations by the elimination of arbitrary functions
12	06	18		
Month : March			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	First order Partial Differential Equations	1)Lagrange's equations Pp + Qq=R 2) Lagrange's methods of solving Pp+Qq=R 3) First Order Non-linear Partial Differential Equations 4) Complete integral, particular integral, singular integral and General integral 5) Charpit's method
12	07	19		

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Prof. S.P. Patankar)
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Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - B.Sc. II

Semester - IV

Subject: Mathematics

Course Title: Integral Calculus

Month : December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	1. Gamma and Beta functions	1. Definition of Beta and Gamma function 2. Basic Properties and examples of Beta function and Gamma Functions. 3. Relation between Beta and Gamma functions. 4. Duplication Formula
12				
Month : January			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	1. Multiple Integrals	1. Double Integral : Evaluation of double integrals 2 Evaluation of double integrals in Cartesian coordinates. 3 Evaluation of double integrals over the given region. 4 Evaluation of double integrals in polar coordinates. 5 Evaluation of double integrals by changing the order of integration. 6 Triple integrals : Evaluation of triple integrals.
10				
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Fourier Series :	1.Definition of Fourier series with Dirichlet condition. 2. Fourier Series for the function f(x) in the interval [$-\pi, \pi$] . 3. Fourier Series for the function f(x) in the interval [-c, c] 4. Fourier Series for the function f(x) in the interval [$0, 2\pi$]. 5. Fourier Series for the function f(x) in the interval [0, 2c]. 6. Even and odd functions.
13				
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Multiple integrals	1. .Change of order of integration 2. Change of Variable, Examples on Triple Integral.
08		08		

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Prof. S.P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - B.Sc. III Semester - VI

Subject: Mathematics Course Title: Metric Space

Month: December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Limits And Metric Spaces	1. Definition and examples of metric spaces. 2. Limits in metric spaces 3. Definition: Sequences and their convergence in metric space, Cauchy sequence in metric space it's Theorems and Examples
09		09		
Month : January			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Continuous Functions on Metric Space	1. Functions continuous at a point on the real line and Definition of Continuity of a function 2. Definition of The open ball of radius r about a. 3. Functions continuous on a metric space: Definition of The open ball of radius r about a in a metric space, Definition of Continuity of function defined on a metric space 4.Open Sets with It's Important Theorems 5. Closed Sets with it's Important Theorem 6. Definition of Homeomorphism, dense subset of a metric space.
15		15		
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Connectedness, Completeness and Compactness	1. More Information of Open sets, Connected Sets and It's Definition and important Theorems 2. Definition of Bounded subset of metric space, totally bounded sets. And it's theorem 3. Complete metric space and it's theorems 4. Compact metric spaces and its' Important Theorem
17		17		
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Some Properties of Continuous functions on Metric Space	1. Continuous functions on compact metric space and it's Theorem 2. Definition of Bounded function 3. Uniform Continuity
07		07		

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Mr. Sagar Sutar

Program: B.Sc. III Semester: VI

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- V

Month: December			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Newton's forward interpolation
00	02	02		2) Newton's backward interpolation
Month: January			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Lagrangian interpolation
00	02	02		2) Divided difference interpolation
Month: February			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Trapezoidal rule
00	02	02		2) Simpson's 1/3rd rule
Month: March			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Second order Runge-Kutta method
00	02	02		2) Fourth order Runge-Kutta method

Name and Signature of Teacher

(Mr. Sagar Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - M.Sc.-II Semester-III

Subject: Mathematics Course Title: Number Theory

Month October			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Divisibility	1. Review of Divisibility: The division algorithm, G.C.D., 2. Euclidean algorithm, Diophantine equation $ax + by = c$, Primes and their distribution 3. Fundamental theorem of arithmetic
16		16		
Month November			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Congruence	1. Congruences: Properties of congruences, 2. Linear congruences, Chinese Remainder Theorem 3. Special divisibility tests, Fermat's theorem, Wilsons's theorem and applications.
17		17		
Month : December			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Number Theoretic function	1. Number Theoretic Functions: Euler's phi function, Euler's theorem 2. Greatest integer function, the functions $\tau$and σ, Mobius function and Mobius inversion formula, Properties of these functions
19		19		
Month : January			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Primitive roots	1. Primitive roots: The order of an integer modulo n, Primitive roots of primes, composite numbers having primitive roots, 2. The theory of indices, The quadratic reciprocity law: Eulerian criteria 3. The Legendre symbol and its properties, quadratic reciprocity, quadratic reciprocity with composite moduli.
16		16		

(Mr. S. T. Sutar)

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Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. S. T. Sutar

Programme - M.Sc. II Semester - IV

Subject: Mathematics Course Title: Fractional Differential Calculus

Month January			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Fractional derivatives	1. Gamma Function, Mittag-Leffler Function, Wright Function 2. Fractional Derivative and Integrals 3. Riemann-Liouville (RL) fractional derivatives-
17	–	17		
Month February			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Link of RL derivative to Grünwald-Letnikov approach	1. Composition of RL derivative with integer order derivatives and fractional derivatives 2. Properties of fractional Derivatives 3. Left and right fractional derivatives 4. Link of RL derivative to Grünwald-Letnikov approach
16	–	16		
Month : March			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Laplace transform	1. Laplace transforms of fractional derivatives 2. Fourier transforms of fractional integrals and derivatives. 3. Mellin transforms of fractional derivatives.
15	–	15		
Month : April			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Existence and uniqueness theorem	1. Linear fractional differential equations (FDE) 2. Fractional differential equation of a general form, 3. Existence and uniqueness theorem as a method of solution. 4. Methods of solving FDE's
15	–	15		

Sutar

Name and Signature of Teacher

(Mr. S. T. Sutar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Prof. S. P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. N. R. Patil

Program: B.Sc. II Semester: III

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- II

Month: July			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Jacobian
00	02	02		2) Extreme values for two variables
Month: August			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Langrange's Method of Undetermined Multipliers
00	02	02		2) Div, Curl & Gradient (examples)
Month: September			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Homogeneous Liner Differential Equations and Reduced to Homogeneous Linear Differential Equations
00	02	02		2) Second Order Linear Differential Equations (One Integral is known)
Month: October			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Second Order Linear Differential Equations (Removal of first order derivative)
00	02	02		2) Second Order Linear Differential Equations (By changing independent variable)

Name and Signature of Teacher

(Ms. N. R. Patil)

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HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Ms. Nikita R. Patil

Programme - B.Sc. III

Semester - V

Subject: Mathematics

Course Title: Numerical Method - I

Month October			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Eigenvalues and eigenvectors	1. Eigenvalues and eigenvectors of a real matrix. 2. Power method for finding an eigen value of greatest modulus, the case of matrix whose "dominant eigen value is not repeated", examples. 3. Method of exhaustion, examples, Method of reduction, examples. Shifting of the eigen value, examples
14		14		

Name and Signature of Teacher

(Ms. Nikita R. Patil)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

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HEAD
Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. Nikita Patil

Program: B.Sc. II

Semester: IV

Subject: Mathematics

Coarse Title: Computational Mathematics Laboratory- II

Month: December			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Gamma and Beta Functions 2) Evaluation of double integrals over the given region
00	02	02		
Month: January			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Fourier Series : $[0, 2\pi]$ 2) Fourier Series : $[-\pi,\pi]$
00	02	02		
Month: February			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Examples on Relation & Equivalence relations 2) Euclidean Algorithm for finding g.c.d.
00	02	02		
Month: March			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Types of graphs 2) Matrix representation of graph
00	02	02		

Name and Signature of Teacher

(Ms. Nikita Patil)

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics
Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Ms. Nikita Patil

Programme - B.Sc. III

Semester - VI

Subject: Mathematics

Course Title: Numerical Method - II

Month : December			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Ordinary Differential Equations	1. Euler's Method, Examples, 2. Second order Runge-Kutta method (formula only). Examples 3. Fourth order Runge-Kutta method(formula only), examples
10		10		

Name and Signature of Teacher

(Nikita Patil)

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Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. N. R. Patil
Programme: M. Sc. I
Subject: Mathematics
Semester: I
Course Title: Ordinary Differential Equations

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Second order homogeneous Equations	1. Second order homogeneous Equations 2. Linear dependence & dependence 3. Non-homogeneous equations of order two 4. Homogeneous equations of order n
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. The non-homogeneous equation of n th order	1. The non-homogeneous equation of n th order 2. Linear Equations with variable Coefficients 3. Wronskian and linear dependence 4. Reduction of order of homogeneous equation
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. The legendre equations	1. Sturm Liouville theory 2. Homogeneous equations with analytic coefficients 3. The legendre equations 4. Linear Equations with regular singular points 5. The Euler equations
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. The Bessel equation	1. The Bessel equation 2. Regular singular points at infinity 3. Existence and uniqueness of solutions: The method of successive approximations 4. The Lipschitz condition
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. N. R. Patil
Programme: M. Sc. I
Subject: Mathematics
Semester: II
Course Title: Partial Differential Equation

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Partial Differential Equations	1. First order Partial Differential Equations 2. Linear equations of first order. 3. Pfaffian differential equations 4. Compatible systems of first order partial differential equations. 5. Compatible systems of first order partial differential equations.
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Cauchy Problem	1. Charpits method, 2. Jacobi method of solving partial differential equations, 3. Cauchy Problem, 4. Method of characteristics to find the integral surface of a quasi linear
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Method of separation of variables	1. Second order Partial Differential Equations. 2. Classification of second order partial differential equation. 3. Vibration of an infinite string 4. Method of separation of variables Uniqueness of solution of wave equation
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Laplace equation	1. Laplace equation, Solution of Laplace equation, 2. Dirichlets problems and Neumann problems. 3. maximum and minimum principles 4. Stability theorem.
16	00	16		

(Ms. N. R. Patil)

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Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. N. R. Patil
Programme: M. Sc. II
Subject: Mathematics
Semester: III
Course Title: Lattice Theory

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Basic concepts	1. Posets, Definition and examples of posets. 2. Two definitions of lattices and their equivalence, examples of lattices. 3. Description of Lattices, some algebraic concepts. 4. Duality principle, Specialelements. 5. Homomorphism, Isomorphism and isotone maps.
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Special types of Lattices	1. Distributive lattices – Properties and characterizations. 2. Modular lattices – Properties and characterizations. 3. Congruence relations. 4. Boolean algebras – Properties and characterizations.
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Ideal theory	1. Ideals and filters in lattices. 2. Lattice of all ideals I(L). 3. Properties and characterizations of I(L). 4Stone's theorem and its consequences.
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Stone algebra	1. Pseudo complemented lattices. 2. S(L) and D(L) – special subsets of pseudo complemented lattices. 3. Distributive pseudo complemented lattice. 4. Stone lattices – properties and characterizations
16	00	16		

(Mr. N. R. Patil)

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Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. N. R. Patil
Programme: M. Sc. II
Subject: Mathematics

Semester: IV
Course Title: Algebraic Number Theory

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Revision of basic module theory	, Fundamental concepts and results, Free modules and matrices, Direct sums of modules, Finitely generated modules over a P.I.D., Equivalence of matrices with entries in a P.I.D., Structure theorem for finitely generated modules over a P.I.D. , Applications to abelian groups, Algebraic Numbers, Quadratic and cyclotomic fields.
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. , Euclidean quadratic fields	Factorization into irreducible , Euclidean quadratic fields
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3.Lattices	Prime factorization of ideals, Lattices, Minkowski's theorem.
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Computational methods	Geometric Representation of algebraic numbers, class groups and class numbers, computational methods.
16	00	16		

(Ms. N. R. Patil)

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Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. A. A. Patil

Programme - B.Sc. II

Semester - III

Subject: Mathematics

Course Title: Differential Equation

Month: July			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Homogeneous Linear Differential Equations :	1.General form of Homogeneous Linear Equations of Higher order and it's solution. 2. Equations reducible to homogeneous linear form.
8				
Month : August			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Second Order linear Differential Equations :	1)General form of Second order linear differential equations. 2)Methods of solution: Complete solution of Linear differential equation when one integral is known. 3) Transformation of the equation by changing the dependent variable 4)Transformation of the equation by changing the independent variable. 5)Method of variation of parameters.
17				
Month :September			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Ordinary Simultaneous Differential Equations :	1) General form of Simultaneous linear differential equation. 2) Methods of solving simultaneous differential equations. 3) Geometrical Interpretation.
08				
Month : October			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Total Differential Equations:	1) Total differential equations [Pfaffian differential equation] $Pdx + Qdy + Rdz = 0$. 2) Necessary condition for integrability of total differential equations. 3) The condition of exactness. 4) Methods of solving total differential equations: (a) Method of Inspection , (b) One variable regarding as a constant. 5)Geometrical interpretation and Relation between Total differential equations and Simultaneous differential equations.
12				

(Mr. A. A. Patil)

Name and Signature of Teacher

(Mr. A. A. Patil)

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. A. A. Patil

Programme - B.Sc. III

Semester - V

Subject: Mathematics

Course Title: Modern algebra

<table>
<tr><td colspan="3">Month July</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Groups</td><td rowspan="2">1. Definition and Binary operations, Definitions and properties, Groups elementary properties.
2. Finite groups and composition tables, Subgroups and its properties, Definition of Centre of group G, Normalizer of an element in G
3. Generators and cyclic groups.Permutations Functions and permutations cycles and cyclic notation, even, odd, permutations, Symmetric group, Alternating groups.
4. Cyclic groups- elementary properties, The classification of cyclic groups, Isomorphisms -Definition and elementary properties
5. Fermat's Theorem, Eulers theorem</td></tr>
<tr><td>15</td><td></td><td>15</td></tr>
<tr><td colspan="3">Month August</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Normal Subgroups, Homeomorphism, permutation group</td><td rowspan="2">1. Cayley's theorem, Groups of cosets, Applications, Normal subgroups Factor groups
2. Definition of Kernel and it's theorem
3. Criteria for existing of a coset group Inner automorphism and Dormal subgroups Simple groups
4. The fundamental theorems of isomorphisms, applications
5. Theorems on Normal groups.</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
<tr><td colspan="3">Month : September</td><td>Module/Unit: III</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Rings</td><td rowspan="2">1. Definition and examples of a Ring, Commutative ring, Ring with unity.
2. Zero divisor, Integral Domain, Division Ring, Field
3. Relation between Ring and Integral Domain
4.Boolean Ring and Definition and examples of Subring
5. Characteristic of a ring: Definition and examples, Definition and examples of Nilpotent, Idempotent, product of rings.
6. Definition and examples of Ideal, Definition of Sum of two ideals. Examples , Definition of Simple Ring.</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
<tr><td colspan="3">Month : October</td><td>Module/Unit: IV</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Homeomorphism and Imbedding of ring</td><td rowspan="2">1. Definition and examples of Quotient Rings, Homomorphism, Kernel of homomorphism.
2. Fundamental Theorem of ring homomorphism, First theorem, Second Theorem
3. Definition of Imbedding ring
4. Definition and examples of Maximal Ideal and Prime ideal.</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
</table>

Name and Signature of Teacher

(Mr. A. A. Patil)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(Mr. S.P.Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Mr. Avinash Patil

Program: B.Sc. III

Semester: V

Subject: Mathematics

Coarse Title: Computational Mathematics Laboratory- VI

Month: July			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) C++ -Introduction : History, Identifiers, Keywords, constants, variables, C++ operations. 2) Data typesin C++: Integer, float, character. Input/Output statements, Header files in C++, iostreanm.h, iomanip.h,math.h.
00	02	02		
Month: August			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Expressions in C++ : (i) constant expression, (ii) integer expression, (iii) float expression, (iv) relational expression,(v) logical expression, (vi) Bitwise expression. Declarations in C++. 2) Program Structure of C++ . Simple program to " WEL COME TO C++ ".
00	02	02		
Month: September			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Control Statements: (a) if, if – else, nested if. (b) for loop, while loop, do-while loop. 2) (c) break, continue, goto, switch statements. *Euclid's algorithm to find gcd and then to find lcm of two numbers a, b * To list 1!, 2!, 3!, … , n! . * To print prime numbers from 2 to n.
00	02	02		
Month: October			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		Arrays : (a) Sorting of an array. (b) Linear search. (c) Binary search. (d) Reversing string.
00	01	01		

Name and Signature of Teacher

(Mr. Avinash Patil)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

(Mr.S. P. Patankar)

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. A. A. Patil

Programme - B.Sc. II

Semester - IV

Subject: Mathematics

Course Title: Discreate Mathematics

Month : December			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Relations	1. Product sets, Relations, Inverse relation, Pictorial representation of relations ,Composition of relations and matrices 2. Types of relation – Reflexive, Symmetric, Anti symmetric, Transitive. and its examples 3. Closure properties and its examples 4. Equivalence relations and partitions ,Examples on Equivalence relation 5. Partial ordering relations ,Congruence Relation and it's theorem
10		10		
Month : January			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Division Algorithm	1. Division Algorithm for positive integers, Division Algorithm for integers, Basic properties of divisibility 2. G.C.D. and it's properties with their proofs 3. Euclidean algorithm ,Examples on Euclidean algorithm. 4. Relatively prime integers and their theorems
12		12		
Month : February			Module/Unit: III	Sub-units planned
Lectures	Practicals	Total	Logic	1. Logical propositions, Logical connectives, Propositional Form, Truth tables, Tautology and contradiction, Logical Equivalence 2. Algebra of propositions 3 Valid Arguments 4 Rules of inference 5 Methods of proofs, Direct proof, Indirect proof 6 Predicates and Quantifiers
10		10		
Month : March			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Graph Theory	1 Graphs and Multi-graphs, Degree of a vertex 2.Hand Shaking Lemma and theorem 3 Complete graph, Regular graph, Bipartite graph, Complete bipartite graph, Complement of a graph 4. Matrix representation of graph, Adjacency Matrix, Incidence Matrix 5. Connectivity, Walk , trail, path and cycle.
13		13		

Name and Signature of Teacher

(Mr. A. A. Patil)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Mr. Avinash Patil

Programme - B.Sc. III

Semester - VI

Subject: Mathematics

Course Title: Linear algebra

<table>
<tr><td colspan="3">Month December</td><td>Module/Unit: I</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Vector Spaces</td><td rowspan="2">1. Definition of vector space and simple examples, Definition of subspace and examples with it's Theorems
2. Definition of sum of subspaces, direct sum, and quotient space. Examples. Homomorphism of vector space (Linear transformations)and examples with it's Theorems
3. Definition of Kernel and Range of homomorphism. Examples and Theorems
4. Definition of Linear Span. Examples and it's Theorems
5. Definition of F.D.V.S. and examples and Theorems</td></tr>
<tr><td>20</td><td></td><td>20</td></tr>
<tr><td colspan="3">Month : January</td><td>Module/Unit: II</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Linear Transformation</td><td rowspan="2">1. Definition of L.T., Rank, Nullity and Examples and Theorems
2. Definition of Sum and Product of L.T. Linear operator, Linear functional, examples and Theorems
3. Definition of Invertible L.T. and examples and Theorems
4. Definition of Matrix of L.T. and examples and Theorem</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
<tr><td colspan="3">Month : February</td><td>Module/Unit: III</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Inner product space</td><td rowspan="2">1. Definition of Inner product space, norm of a vector and examples and Theorems
2. Definition of Orthogonal vectors and orthonormal sets
3. Gram-Schmidt orthogonalisation process</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
<tr><td colspan="3">Month : March</td><td>Module/Unit: IV</td><td>Sub-units planned</td></tr>
<tr><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Eigenvalues And Eigenvectors</td><td rowspan="2">1. Definition of Eigen values, Eigen vectors, Eigen space of order n and it's Examples
2. Theorems and Definition of Characteristic Polynomials.
3. Characteristic polynomial of a Linear operator and remarks on it.
4. Examples on eigen values and eigen vectors</td></tr>
<tr><td>12</td><td></td><td>12</td></tr>
</table>

Name and Signature of Teacher

(Mr. Avinash Patil)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

(S.P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Mr. Avinash Patil

Program: B.Sc. III

Semester: VI

Subject: Mathematics

Coarse Title: Computational Mathematics Laboratory- VI

Month: December			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Functions : User defined functions of four types with illustrative programs each.. 2) Numerical Methods to find roots of a given function : (a) Bisection function. (b) Newton – Raphson Method.
00	02	02		
Month: January			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Interpolation : (a) Lagrange's interpolation formula. (b) Newton Gregory forward interpolation formula. (c) Newton Gregory backward interpolation formula.
00	01	01		
Month: February			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Numerical Methods for solution of a system of Linear Equations:(Unique solution case only) (a) Gauss – Elimination Method. (b) Gauss – Jorden Method.
00	01	01		
Month: March			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Computation with Scilab
00	01	01		

Name and Signature of Teacher

(Mr. Avinash Patil)

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. I
Subject: Mathematics

Semester: I
Course Title: Advanced Calculus

Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	.Multivariable differential Calculus:	1.Multivariable differential Calculus: The Directional derivatives, directional derivatives and total derivative 2.Total derivatives expressed in terms of partial derivatives, The matrix of linear function, Jacobin matrix, Chain rule, mean value theorem for differentiable functions, 3. A sufficient condition for differentiability,Taylor's formula for functions from R. to R. The inverse function theorem Implicit Functions The implicit function theorem (Statement only) and their applications. 4. Extrema of real valued functions of one variable, Extrema of real valued functions of several
16	00	16		

(Mr. G. B. Kolhe)

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Department of Mathematics
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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. I
Subject: Mathematics

Semester: I
Course Title: Algebra

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Simple Groups	1)Permutation group, Group of symmetry, Dihedral group, Commutator subgroups Simple groups, simplicity of An , 2) Normal and subnormal series, Jordan-Holder theorem 3) Solvable groups, Nilpotent group, isomorphism theorems (Statement only) 4) Zassenhaus Lemma, Schreier refinement theorem.
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Group Action	1) Group action on a set, isometry subgroups, Burnside theorem 2) Direct product and semidirect product of groups, Syllow theorems, p-subgroups, 3) Group of order and pq, 4)Class equation and applications
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Rings of Polynomial	1) Ring of Polynomials, Factorization of polynomials over fields, 2) Irreducible polynomials, Eisenstein criterion, ideals in F[x], unique 3) factorization domain, principal ideal domain 4)Gauss lemma, Euclidean Domain
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Module	1) Modules, sub-modules, quotient modules, 2) homomorphism and isomorphism theorems, fundamental theorem for modules 3) completely reducible modules, free modules.
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. I
Subject: Mathematics

Semester: II
Course Title: Linear Algebra

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Vector Space	1) Direct sum of a vector space 2) Dual Spaces, Annihilator of a subspace, 3) Quotient Spaces 4) Algebra of Linear transformations.
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Inner product space	1) Adjoint of a linear transformation, Inner product spaces 2) Eigen values Eigen vectors of a linear transformation 3) Diagonalization 4) Invariant subspaces
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Canonical forms	1) Canonical forms, Similarity of linear transformations 2) Reduction to triangular forms, Nilpotent transformations 3) Primary decomposition theorem, Jordan blocks and Jordan forms 4) variants of linear transformations
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Symmetric bilinear formss	1) Hermitian, Self adjoint, Unitary and normal linear transformation 2) Symmetric bilinear forms 3) skew symmetric bilinear forms 4) Group preserving bilinear forms
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. I
Subject: Mathematics

Semester: II
Course Title: Measure and Integration

Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Lebesgue Integral,	1) The General Lebesgue Integral, 2) Characterization of Riemann and Lebesgue Integrability, 3) Differentiability of Monotone Functions, Lebesgue's Theorem, 4) Functions of Bounded Variations:Jordan's Theorem
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Absolutely Continuous Functions	1) Absolutely Continuous Functions, 2)Integrating Derivatives: Differentiating Indefinite Integrals, 3) Normed Linear Spaces, Inequalities of Young, Holder and Minkowski, 4)The Riesz-Fischer Theorem.
16	00	16		

G. B. Kolhe

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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. II
Subject: Mathematics
Semester: III
Course Title: Functional Analysis

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Normed Linear Spaces	Normed linear spaces, Banach spaces, Quotient spaces, Continuous linear transformations, Equivalent norms, Finite dimensional normed spaces and properties, Conjugate space and separability, The Hahn-Banach theorem and its consequences
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Second conjugate space	Second conjugate space, the natural embedding of the normed linear space in its second conjugate space, Reflexivity of normed spaces, Weak * topology on the conjugate space. The open mapping theorem, Projection on Banach space, the closed graph theorem, the conjugate of an operator, the uniform boundedness principle
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Hilbert spaces	Hilbert spaces: examples and elementary properties, Orthogonal complements, The projection theorem, Orthogonal sets, The Bessel's inequality, Fourier expansion and Perseval's equation, separable Hilbert spaces, The conjugate of Hilbert space, Riesz's theorem, The adjoint of an operator.
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Self adjoint operators	Self adjoint operators, Normal and Unitary operators, Projections, Eigen values and eigenvectors of an operator on a Hilbert space, The determinants and spectrum of an operator, The spectral theorem on a finite dimensional Hilbert space.
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. G. B. Kolhe
Programme: M. Sc. II
Semester: IV
Subject: Mathematics
Course Title: Field Theory

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Field Extensions	Extension of a field,Algebraic extensions,Algebraically closed fields,Derivatives and multiple roots,Finite Fields..
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Galois Theory	Separable and normal extensions,Automorphism groups and fixed fields,Fundamental theorem of Galois theory.
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Finite Fields	Finite Fields Prime fields,Fundamental theorem of algebra,Cyclic extensions,Cyclotomic extensions.
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Applications of Galois theory	Constructions by ruler and compass ,Solvable groups ,Polynomials solvable by radical.
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. S. K. Kumbhar

Program: B.Sc. II Semester: III

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- III

Month: July			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) C-Introduction : History, Identifiers Keywords, constants, variables, Mathematical operations. 2) Data types: Integer, real, character types, input/output statements, C-program structure, simple C-programs.
00	02	02		
Month: August			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Control Structures (decision): if, If – else statements, simple illustrative C-programs. 2) Loop Structure (I) : for loop, *-figures, factorial, series sum problems, Fibonacci sequence.
00	02	02		
Month: September			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Loop Structure (II) : while, do-while loops, exp(x), cos(x), sin(x) by series sum and comparison with lib. Function value. 2)Break, Continue, Go to, switch statements : Illustrative C-programs. Testing a number to be prime or not prime.
00	02	02		
Month: October			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Arrays 1- dimensional : Max/min of n elements, sorting of an array. 2) Arrays 2- dimensional : Transpose, addition, subtraction, multiplication in case of matrices
00	02	02		

SKumbhar.

Name and Signature of Teacher

(Ms. S. K. Kumbhar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR 416 003

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. S. K. Kumbhar

Program: B.Sc. III Semester: V

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- IV

Month: July			Module/Unit I	Subunits Planed
Lectures	Practical	Total	Linear Programming	1) Simplex Method : Maximization Case 2) Simplex Method : Minimization Case
00	02	02		
Month: August			Module/Unit II	Subunits Planed
Lectures	Practical	Total	Linear Programming	1) Two-Phase Method 2) Big-M-Method
00	02	02		
Month: September			Module/Unit III	Subunits Planed
Lectures	Practical	Total	Transportation Problems	1) North- West Corner Method 2) Least Cost Method
00	02	02		
Month: October			Module/Unit IV	Subunits Planed
Lectures	Practical	Total	Transportation Problems	1) Vogel's Approximation Method 2) Optimization of T.P. by Modi Method
00	02	02		

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. Sushmita Kumbhar

Program: B.Sc. II Semester: IV

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- III

Month: December			Module/Unit I	Subunits Planed
Lectures	Practical	Total		1) Function : User defined functions, C-program - n Cr using function.
00	01	01		
Month: January			Module/Unit II	Subunits Planed
Lectures	Practical	Total		1) Numerical Integrations : (In C Program) a) Trapezoidal rule b) Simpson's (1/3)rd rule c) Simpson's (3/8)th rule.
00	01	01		
Month: February			Module/Unit III	Subunits Planed
Lectures	Practical	Total		1) Numerical Methods for solution of Linear Equations: (Using Calculators) a) Gaussian Elimination Method b) Gauss – Jorden (Direct)Method c) Gauss Seidel (Iterative)Method.
00	01	01		
Month:March			Module/Unit IV	Subunits Planed
Lectures	Practical	Total		1) Numerical Methods for solution of Ordinary Differential Equations: (Using Calculators) a) Euler Method 2 b) Euler Modified Method c) Runge- Kutta Second and Fourth order Method.
00	01	01		

Skumbhar.

Name and Signature of Teacher

(Ms. Sushmita Kumbhar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

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Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of Teacher: Ms. S. K. Kumbhar

Program: B.Sc. III Semester: VI

Subject: Mathematics Coarse Title: Computational Mathematics Laboratory- IV

Month: December			Module/Unit I	Subunits Planed
Lectures	Practical	Total	Assignment Problems	1) Hungarian Method 2) Maximization Case in Assignment Problem
00	02	02		
Month: January			Module/Unit II	Subunits Planed
Lectures	Practical	Total	Assignment Problems	1) Unbalanced Assignment Problems 2) Traveling Salesman Problem
00	02	02		
Month: February			Module/Unit III	Subunits Planed
Lectures	Practical	Total	Theory of Games	1) Games with saddle point 2) Games without saddle point : (Algebraic method)
00	02	02		
Month: March			Module/Unit IV	Subunits Planed
Lectures	Practical	Total	Theory of Games	1) Games without saddle point: a) Arithmetic Method b) Matrix Method 2) Games without saddle point : Graphical Method
00	02	02		

Skumbhar

Name and Signature of Teacher

(Ms. S. K. Kumbhar)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

(S. P. Patankar)

HEAD

Department of Mathematics

Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. S. K. Kumbhar
Programme: M. Sc. I
Semester: I
Subject: Mathematics
Course Title: Classical Mechanics

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1 Mechanics of a particle,	1.Mechanics of a particle, Mechanics of a system of particles, conservation theorems, constra 2.Generalised coordinates, D' Alembert's Principle, Lagrange's equations of motion, sin applications of Lagrangian formulation 3. Kinetic energy as a homogeneous function generalised velocities, Non-conservation of total energy due to the existence of non-conserva forces. 4.Cyclic co-ordinates and generalised momentum, conservation theorems
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Euler-Lagrange's equations	1.Functionals, basic lemma in calculus of variations, Euler-Lagrange's equations, first integral Euler- Lagrange's equations, the case of several dependent variables 2.Undetermined conditions, Geodesics in a plane and space, the minimum surface of revolution, the problem Brachistochrone 3. Isoperimetric problems, problem of maximum enclosed area.Hamilto Principle, Derivation of Hamilton's principle from D'Alembert's principle, Lagrange's equati of motion from Hamilton's principle. 4.Lagrange's equations of motion for nonconserva systems (Method of Langrange's undetermined multipliers)
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Hamiltonian function	1. Hamiltonian function, Hamilton's canonical equations of motion, Derivation of Hamilt equations from variational principle 2. Physical significance of Hamiltonian, the principle of l action 3. cyclic co-ordinates and Routh's procedure. Orthogonal transformations 4. Properties transformation matrix, infinitesimal rotations
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. The Kinematics of rigid body motion	1.The Kinematics of rigid body motion: The independent co-ordinates of a rigid body, the Eule angles 2. Euler's theorem on motion of rigid body,Angular momentum and kinetic energy rigid body with one point fixed 3. the inertia tensor and moment of inertia, Euler's equations motion, Cayley- Klein parameters 4. Matrix of transformation in Cayley- Klein paramet Relations between Eulerian angles and Cayley- Klein parameters
16	00	16		

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HEAD
Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. S. K. Kumbhar
Programme: M. Sc. I
Semester: II
Subject: Mathematics
Course Title: Numerical Analysis

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Iterative solutions	1.Iterative solutions of Transcendental & polynomial equations: Bisection method, 2. Iteration methods based on First degree equation 3.Secant method, Regula Falsi method Newton Raphson
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. linear System of algebraic equations and Eigenvalue problems	1.linear System of algebraic equations and Eigenvalue problems: Iteration methods (Jacobi iteration method, Gauss seidel iteration method) 2.convergence analysis, Matrix factorization methods (Doo little reduction, Crout reduction), 3.Eigen values and eigenvectors, Gerschgorin theorem, Brauer theorem, Jacobi method for symmetric matrices 4. Householder's method for symmetric matrices, power method.
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Interpolation	1.Interpolation, differentiation and integration: Lagrange and Newton interpolation, Truncation error bounds, 2.Newtons divided difference interpolation, finite difference operators, Hermites interpolation, 3. Cubic spline interpolation, numerical differentiation, methods based on interpolation, numerical integration 4. Error analysis, methods based on interpolation Newton cotes methods, Error estimates for trapezoidal and Simpson's rule.
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Numerical solution of ordinary differential equations	1.Numerical solution of ordinary differential equations: Euler's method, analysis of Euler's method, 2.Backward Euler's method, order of Euler's method, Explicit Runge -Kutta method of order two and four, midpoint method 3. Taylor series method, convergence and stability of numerical methods 4.Truncation error, error analysis.
16	00	16		

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Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Ms. S. K. Kumbhar
Programme: M. Sc. I
Subject: Mathematics

Semester: III
Course Title: Operational Research- I

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Convex Set and LPP:	1)Convex set and their properties. 2)Lines, hyperplanes and polyhedral convex set and its theorems. 3)Convex combination of vectors, convex hull. Simplex and convex function. 2) General form of linear programming and Matrix form of linear programming. 3)Definition of standard LPP and theorems of it.
15	00	15		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Simplex Method:	1) Computational procedure of simplex method. Problem of degeneracy, revised simplex method in standard form- I 2) Duality in linear programming and duality theorems. 3)Integer linear programming: Gomory's cutting plane method, Branch and Bound method.
18	00	18		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Dynamic Programming:	1) Bellman's Principle of Optimality 2) Application of Dynamic Programming in production 3) Inventory control and linear programming.
15	00	15		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Non linear Programming:	1) Unconstrained problems of maximum and minimum 2) Lagrangian method Kuhn Tucker necessary and sufficient conditions 3) Wolfe's method and Beale's method
16	00	16		

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Vivekanand College, Kolhapur (Autonomous)

Department of mathematics

Academic Year: 2018-19

Annual Teaching Plan

Name of the teacher: Ms. S. K. Kumbhar

Programme - M. Sc II

Semester - IV

Subject: Mathematics

Course Title: Operation Research II

Month March			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	Replacement Policy	1. Replacement Problems 2. Failure mechanism of items 3. Replacement policy for items whose maintenance cost increases with time and money values is constant 4. Group replacement of items that fail completely
16		16		
Month April			Module/Unit: II	Sub-units planned
Lectures	Practicals	Total	Inventory Models	1. Inventory – Cost involved in inventory problems 2. variables in inventory problem, symbols in inventory concept of EOQ, 3. Methods with calculus method 4. Model I (a) The economic lot size system with uniform demand 5. Model I (b) Economic lot size with different rates of demand in different cycles. 6. Model I (c) Economic lot size with finite Rate of Replenishment.,(EOQ production model) 7. EOQ model with shortages
16		16		
Month : May			Module/Unit: II,III	Sub-units planned
Lectures	Practicals	Total	Inventory Models	1. Model II(a) The EOQ with constant rate of demand, scheduling, time constant.
16		16	Queuing Theory	1. Queuing Theory 2. Queuing systems 3. Queuing Problems: transient and steady states, traffic intensity, Probability distributions in Queuing systems 4. Poisson process, Properties, Exponential process, 5. Classification of Queuing Models
Month : June			Module/Unit: III and IV	Sub-units planned
Lectures	Practicals	Total	Queuing Theory	1. Model I:(M/M/I): (∞/FCFS), Model II (a): General Erlang queuing model.
15		15	Information Theory	1. Information Theory: Communication process, Quantitative measure of information 2. Uniqueness theorem, Chanel capacity, efficiency and redundancy Encoding, Shannon Fano encoding procedure 3. PERT / CPM: Applications of PERT /CPM techniques, 4. Network diagram, representations. Rules for constructing the Network diagram 5. determination of the critical path.

(Ms. S. K. Kumbhar)

(Prof. S. P. Patankar)

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Vivekanand College, Kolhapur

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR-416 003

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. P.S. Mane
Programme: M. Sc. I
Subject: Mathematics

Semester: I
Course Title: Advanced Calculus

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Functions of Bounded Variations	1.Functions of Bounded Variation& Rectifiable Curves - Introduction, Properties of monotonic functions 2. functions of Bounded Variation(B.V.), Total Variation(T.V.), additive property of TV, TV on [a, x] as function of x, 3.function of B.V. expressed as the difference of increasing functions, continuous functions of B.V. 4. curves & paths, rectifiable paths, line integral,
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Riemann Stieltje's Integral	1.The Riemann-Stieltje's (R.S.) Integral Introduction, notation, definition, linear property, integration by parts, 2.change of variable, reduction to Riemann integration, Step functions as integrator, reduction to finite sum, Euler's summation formula, 3.additive & linearity property of upper & lower integrals, Riemann's condition, Comparison theorem, 4.Integration of B.V. Necessary condition for existence of RS integrals,
15	00	15		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Sequences and series of functions	1.Sequences and series of functions - Pointwise convergence of sequences of functions, uniform convergence, Uniform convergence and continuity, Cauchy condition for uniform convergence, 2. Uniform convergence and Riemann integration, , uniform convergence and double sequences, mean convergence. Multiplication of series, 3. Power series, multiplication of power series, substitution theorem, reciprocal of power series, Real power series, 4.The Taylor series generated by function, Bernstein's theorem, Binomial series.
17	00	17		

PSMane

(Mr. P.S. Mane)

VIVEKANAND COLLEGE ESTD. JUNE 1964 KOLHAPUR

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HEAD
Department of Mathematics
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)
Department of Mathematics
Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. P.S. Mane
Programme: M. Sc. I
Subject: Mathematics

Semester: I
Course Title: Complex Analysis

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Analytic Functions	1. Power series, radius of convergence, 2. Analytic functions, zeros of an analytic function, 4. Cauchy-Riemann equations, 5. Harmonic functions, 6. Mobius transformations
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Cauchy Integral	1. Power series representation of analytical function. 2. Liouville's theorem, Fundamental theorem of algebra, 3. Maximum modulus theorem, the index of closed curve, 4. Cauchy's theorem and integral formula, Morera's theorem.
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Singularities	1. Counting zero's, The open mapping theorem, Goursat's Theorem. 2. Classification of singularities, Laurent series development. 3.Casorati- weierstrass theorem.
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Residues	1. The argument principle, Rouche's theorem, the maximum principle. Schwar's lemma 2. Residues, residues and its applications to characterize conformal maps.
16	00	16		

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Annual Teaching Plan

Name of the teacher: Mr. P. S. Mane
Programme: M. Sc. I
Subject: Mathematics

Semester: II
Course Title: Topology

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Topological spaces	1. Topological spaces, Examples 2. Limit points, closed set and closure 3. Interior, Exterior, neighbourhood 4. Different ways of defining topology. 5. Bases, Subbases, subbases of topological subspaces 6. Hereditary Properties
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Connected spaces,	1 Connected spaces, components 2 connected subspaces of real line, compact space one point compactification, 3 continuous function 4. Homeomorphisms 5. Topological Properties
15	00	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical	Total	3. Separable spaces	1. Separation Axioms: spaces 2. First and second axiom spaces 3. Separable spaces 4. Lindelof spaces 5. Regular and spaces 6. Normal and space
17	00	17		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical	Total	4. Completely regular spaces	1. Completely regular spaces 2. Completely normal and spaces 3. Product spaces
16	00	16		

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Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. P.S. Mane.
Programme: M. Sc. I
Subject: Mathematics

Semester: II
Course Title: Measure and Integration

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical	Total	1. Lebesgue Outer Measure	1) Open Sets, Closed Sets and Borel Sets 2) Lebesgue Outer Measure, The sigma algebra of Lebesgue Measurable Sets, Countable Additivity 3) Continuity and Borel-Cantelli Lemma 4) nonmeasurable set.
18	00	18		
Month: February			Module/Unit:	Sub-units planned
Lectures	Practical	Total	2. Measurable Functions	1) Sums, Product and Composition of Measurable Functions, 2) Sequential Pointwise limits and Simple Approximation. Littlewood's Three Principles 3) Egoroff's Theorem and Lusin's Theorem,Lebesgue 4) Integration of a Bounded Measurable Function, Lebesgue Integration of a Non-negative Measurable Function.
15	00	15		

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Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. P. S. Mane
Programme: M. Sc. II Semester: III
Subject: Mathematics Course Title: Advanced Discrete Mathematics

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Graph Theory	Graph Theory: Definition, examples and properties, Simple graph, Graph isomorphism, Bipartite graphs, Complete Bipartite graph, regular graph, sub-graphs spanning sub-graph, Edge deleted sub-graph, Vertex deleted sub-graph, Union and intersection of two graphs, complements of a graph, self complementary graph, paths and cycles in a graph, Eccentricity, radius and diameter of a connected graph, Peterson graph, Wheel graph. Isomorphism of Graphs. First theorem of graph theory
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Adjacency matrix	The Matrix representation of a graph, Adjacency matrix and Incidence matrix of a graph, Definition and simple properties of a tree, bridges, spanning trees, Inclusion exclusion principle. Simple examples on Inclusion exclusion principle Pigeonhole principle, examples on Pigeonhole principle
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Recurrence Relation	Discrete numeric functions and sum and product of two numeric functions, generating functions, Linear recurrence relations with constant coefficients Particular solutions of linear recurrence relations, Total solutions.
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Lattices	Ordered sets and lattices Hasse diagrams of posets ,Supremum and infimum ,Isomorphic ordered sets, well-ordered sets,Lattices, Bounded lattices , Distributive lattices, Complements complemented lattices , Boolean algebra, Basic definitions, Basic theorems, duality, Boolean algebras as lattices
16	00	16		

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Academic Year: 2018-2019

Annual Teaching Plan

Name of the teacher: Mr. P.S. Mane
Programme: M. Sc. II Semester: IV
Subject: Mathematics Course Title: Integral Equation

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Integral equations	Classification of linear integral equations, Conversion of initial value problem to Volterra integral equation, Conversion of boundary value problem to Fredholm integral equation, Separable kernel, Fredholm integral equation with separable kernel, Fredholm alternative. Homogeneous Fredholm equations and eigenfunctions.
18	00	18		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Fredholm integral equations	Solutions of Fredholm integral equations by: Successive approximations Method, Successive substitution Method, Adomian decomposition method, Modified decomposition method, Resolvent kernel of Fredholm equations and its properties, Solutions of Volterra integral equations: Successive approximations method, Neumann series, Successive substitution Method.
15	00	15		
Month: Octomber			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Volterra integral equations	Solution of Volterra integral equations by Adomian decomposition method, and the modified decomposition method, Resolvent kernel of Volterra equations and its properties, Convolution type kernels, Applications of Laplace and Fourier transforms to solutions of Volterra integral equations, Symmetric Kernels: Fundamental properties of eigenvalues and eigenfunctions for symmetric kernels, expansion in eigenfunctions and bilinear form
17	00	17		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	symmetric integral equations	Hilbert Schmidt Theorem and its consequences, Solution of symmetric integral equations, Operator method in the theory of integral equations, Solution of Volterra and Fredholm integrodifferential equations by Adomian decomposition method, Green's function: Definition, Construction of Green's function and its use in solving boundary value problems.
16	00	16		

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