

DEPARTMENT OF MATHEMATICS AND STATISTICS
BHAVAN'S VIVEKANANDA COLLEGE

Autonomous College

B.Sc. I YEAR SEMESTER -I 18 19 CBCS

Sub- MATHEMATICS PAPER- MT121 (Classes per week - 4)

DIFFERENTIAL EQUATIONS & GROUP THEORY

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT |
|-----------------------|----------|---|---------------------|
| JUNE | 1 | UNIT III Groups-I (18) | |
| | 1 | Introduction | 1 |
| | 2 | Groups-Definition and Elementary Properties | 4 |
| JULY | 3 | Finite Groups and Group Tables | 3 |
| | 4 | Subgroups | 3 |
| JULY | 5 | Cyclic Groups-Elementary properties, cyclic subgroups | 7 |
| | 2 | UNIT IV Groups-II (15) | |
| JULY | 1 | Permutations -functions and permutations | 1 |
| | 2 | Cycles and cyclic notations | 1 |
| | 3 | Even and odd permutations, | 1 |
| | 4 | Groups of permutations, Alternating groups | 1 |
| AUGUST | 5 | Groups of Coset | 3 |
| | 6 | Criteria for the existence of a coset group | 1 |
| | 7 | Inner automorphism and Normal Subgroups, Definition of Factor group | 2 |
| | 8 | Homomorphisms-Def. and Elementary properties | 2 |
| | 9 | The fundamental theorem of homomorphism, applications | 1 |
| | 10 | Isomorphism-Def. and Elementary properties, Cayley's theorem | 2 |
| | 3 | UNIT I D.E. of First Order and First Degree (15) | |
| AUG & SEP | 1 | Introduction | 1 |
| | 2 | Partial differentiation | 1 |
| | 3 | Exact Differential Equations | 2 |
| | 4 | Non-Exact Differential Equations, Integrating factors, Methods | 6 |
| | 5 | Linear Differential Equations | 3 |
| | 6 | Differential Equations Reducible to Linear Form | 2 |
| | 4 | D.E. of the First Order but not of the First Degree (12) | |
| SEPT & OCT | 1 | Equations Solvable for p | 3 |
| | 2 | Equations Solvable for y | 2 |
| | 3 | Equations Solvable for x | 2 |
| | 4 | Clairaut's Equation | 2 |
| | 5 | Total differential equations | 3 |
| GRAND TOTAL | | | 60 |

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DEPARTMENT OF MATHEMATICS & STATISTICS

ACADEMIC ORGANISER

B.Sc. I YEAR SEMESTER -II CBCS 18- 19

Sub- MATHEMATICS PAPER- MT221

DIFFERENTIAL CALCULUS & HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS

CLASSES PER WEEK-4

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT |
|--------------------|----------|---|---------------------|
| 1 | | Differential Calculus I (15) | |
| NOV | 1 | Introduction | 1 |
| | 2 | Successive differentiation | 3 |
| | 3 | Calculation of nth derivatives of standard, rational & products of powers of sines and cosines | 2 |
| | 4 | The nth derivative of product of two functions. | 3 |
| DEC | 5 | Leibnitz's theorem | 2 |
| | 6 | Partial differentiation | 1 |
| | 7 | Homogeneous functions and Eulers theorem. | 2 |
| | 8 | Total derivatives | 1 |
| 2 | | Differential Calculus II (15) | |
| DEC | 1 | Indeterminate forms | 3 |
| | 2 | Neighbourhood, interval, supremum, infimum, limits, continuity, differentiability | 1 |
| | 3 | Rolles, Lagrange's & Cauchy's theorem with geometric explanation. | 4 |
| | 4 | Taylor's and Maclaurin's series | 3 |
| JAN | 5 | Expansion of functions, Taylor's and Maclaurin's theorem | 3 |
| | 6 | Maxima and minima of two variables | 1 |
| 3 | | Higher Order Linear Differential Equations-I (15) | |
| JAN | 1 | Solution of Homogeneous Linear Differential Equations of Order n with Constant Coefficients | 3 |
| | 2 | Solution of Non-homogeneous Linear Differential Equations with Constant Coefficients by means of Polynomial Operators (e^{ax} , $\sin bx$ or $\cos bx$, x^k) | 4 |
| FEB | 3 | Solution of Non-homogeneous Linear Differential Equations with Constant Coefficients by means of Polynomial Operators (e^{ax} , x^k) | 8 |
| 4 | | Higher Order Linear Differential Equations II (15) | |
| FEB&MAR | 1 | Method of Variations of Parameters (Non-homogeneous Linear Differential Equations with Constant Coeff.) | 3 |
| | 2 | Method of undetermined coefficients | 3 |
| | 3 | Reduction of order method | 3 |
| | 4 | The Cauchy-Euler Equation | 3 |
| | 5 | Legendre's equation | 3 |
| | | GRAND TOTAL | 60 |

BHAVAN'S VIVEKANANDA COLLEGE
DEPARTMENT OF MATHEMATICS & STATISTICS
ACADEMIC ORGANISER 18-19

RING THEORY & PARTIAL DIFFERENTIAL EQUATIONS

B.Sc. II YEAR
Sub- MATHEMATICS

SEMESTER -III
PAPER- MT321

Classes per week - 4

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT |
|----------------------|---|---|---------------------|
| 1 | Rings-I (15) | | |
| JUNE | 1 | Introduction | 1 |
| | 2 | Rings-Def. ,Some non-commutative Examples , basic properties | 2 |
| | 3 | Divisors of zero ,cancellation laws | 2 |
| | 4 | Integral Domains, Fields | 3 |
| | 5 | Characteristic of a ring | 2 |
| JULY | 6 | Ideals and Factor Rings. | 5 |
| 2 | Rings-II (15) | | |
| JULY | 1 | Homomorphisms of rings-Def, elementary properties, kernal of homomorshism | 4 |
| | 2 | Maximal and prime ideals , Prime fields | 4 |
| | 3 | Rings of Polynomials-Polynomials in an indeterminate form | 4 |
| | 4 | The evaluation homomorphism | 3 |
| 3 | PARTIAL DIFFERENTIAL EQUATIONS-I (15) | | |
| AUGUST | 1 | Introduction | 1 |
| | 2 | Formation of partial differential equations | 3 |
| | 3 | Easilyintegrable partial differential equations | 1 |
| | 4 | Linear partial differential equations of first order | 2 |
| | 5 | Non Linear partial differential equations of first order | 5 |
| SEP | 6 | Charpits method | 3 |
| 4 | PARTIAL DIFFERENTIAL EQUATIONS-II (15) | | |
| SEP & OCT | 1 | Homogeneous linear equations with constant coefficients | 8 |
| | 2 | Non Homogeneous linear partialdifferential equations | 4 |
| | 3 | Separation of variables | 3 |

Total- 60



BHAVAN'S VIVEKANANDA COLLEGE
DEPARTMENT OF MATHEMATICS & STATISTICS
ACADEMIC ORGANISER 18-19
REAL ANALYSIS

B.Sc. II YEAR
 Sub- MATHEMATICS

SEMESTER -IV
 PAPER- MT421

CLASSES PER WEEK - 4

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT |
|------------------------|----------------------|---|---------------------|
| 1 | UNIT-I (15) | | |
| NOV | 1 | Limit of Sequences | 4 |
| | 2 | Limit Theorems for Sequences | 4 |
| DEC | 3 | Monotone Sequences | 4 |
| | 4 | Cauchy Sequences | 3 |
| 2 | UNIT-II (15) | | |
| DEC | 1 | Subsequences | 4 |
| | 2 | Lim sup's and Lim inf's | 1 |
| JAN | 3 | Series | 5 |
| | 4 | Alternating Series | 3 |
| | 5 | Integral Tests | 2 |
| 3 | UNIT-III (15) | | |
| JAN | 1 | Sequences of functions | 3 |
| | 2 | Series of functions | 3 |
| | 3 | Power Series | 3 |
| FEB | 4 | Uniform Convergence | 3 |
| | 5 | Differentiation and Intergration of Power Series(Theorems in this section without proofs) | 3 |
| 4 | UNIT-IV (15) | | |
| FEB & MARCH | 1 | The Riemann Integral | 5 |
| | 2 | Properties of Riemann Integral | 5 |
| | 3 | Fundamental Theorem of Calculus | 5 |

Total - 60

DEPARTMENT OF MATHEMATICS
BHAVAN'S VIVEKANANDA COLLEGE
ACADEMIC ORGANISER
MATHEMATICS PAPER III

B.Sc. - III Year SEM -V(2018-19)

MT 521-LINEAR ALGEBRA

CLASSES PER WEEK - 3

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|--------------------|----------|--|---------------------|---------------|
| 1 | | VECTOR SPACES-I | | |
| JUNE | 1 | Vector Space and Subspace | 3 | 17 |
| | 2 | Linear combinations, Subspace spanned by a set | 3 | |
| | 3 | Linearly Independent and dependent sets | 3 | |
| JULY | 4 | Basis | 3 | |
| | 5 | The co-ordinate system | 2 | |
| | 6 | The dimension of a vector space | 3 | |
| 2 | | VECTOR SPACES-II | | |
| JULY | 1 | Null space, Column space and Row space of a matrix | 2 | 10 |
| | 2 | Basis and dimensions of Null space, Column space and Row space of a matrix | 2 | |
| | 3 | Linear Transformations, Kernel and range of Linear Transformations | 2 | |
| AUG | 4 | Rank and rank theorem | 3 | |
| | 5 | Matrix of a Linear Transformations. | 1 | |
| 3 | | EIGEN VALUES AND EIGEN VECTORS | | |
| AUG | 1 | Eigen values , Eigen Vectors | 2 | 8 |
| | 2 | The characteristic Equation | 2 | |
| SEP | 3 | Diagonalization | 3 | |
| | 4 | Complex Eigen values. | 1 | |
| 4 | | INNER PRODUCT OF VECTORS | | |
| OCT | 1 | Inner Product, Length and Orthogonality | 3 | 10 |
| | 2 | Orthogonal set | 2 | |
| | 3 | Gram-Schmidt Process | 3 | |
| | 4 | Orthonormal Basis. | 2 | |
| GRAND TOTAL | | | | 45 |

BHAVAN'S VIVEKANANDA COLLEGE
OF SCIENCE, HUMANITIES AND COMMERCE
 Sainikpuri, Secunderabad-500094
 Autonomous College
 Affiliated to Osmania University
TEACHING PLAN: 2018-19
 Program: B. Sc (M/E//P/S/Cs)
 Paper Title: **MT521A: VECTOR CALCULUS**

| | | |
|--|-------------------------------------|--|
| <u>DEPARTMENT OF MATHEMATICS AND STATISTICS</u> | <u>YEAR/ SEMESTER III/VI</u> | <u>NO.OF CLASSES PER WEEK</u> 3 HRS PER WEEK(45) <u>PRACTICALS 2 CLASSES PER WEEK</u> |
|--|-------------------------------------|--|

| <u>MONTH</u> | <u>UNIT</u> | <u>TOPIC</u> | <u>NUMBER OF CLASSES</u> |
|--------------------------------|--------------------|--|---------------------------------|
| JUNE & JULY | I | Vector differentiation and partial differentiation | 5 |
| | | Vector differential operators – Gradient, Divergence, Curl | 5 |
| | | Formulae involving Del | 2 |
| | | Problems related Gradient, Divergence, Curl | 3 |
| | II | Definite Integral, Line Integrals | 4 |
| AUGUST | III | Surface Integrals. | 6 |
| | | Volume Integrals | 5 |
| | | Gauss Divergence theorem and its applications | 5 |
| SEPTEMBER & OCTOBER | IV | GREENS theorem and its applications | 5 |
| | | STOKES theorem and its applications | 5 |
| | | Total Classes | 45 |



DEPARTMENT OF MATHEMATICS
BHAVAN'S VIVEKANANDA COLLEGE
ACADEMIC ORGANISER
MATHEMATICS PAPER III

B.Sc. - III Year SEM -VI(2018-19)

MT 621A-SOLID GEOMETRY

CLASSES PER WEEK -3

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|--------------------|----------|--|---------------------|---------------|
| 1 | | SPHERES | | |
| NOV | 1 | Introduction, Definition, Equation of a sphere | 2 | 13 |
| | 2 | Sphere through four given points,, Equation of a Sphere under Different Conditions | 3 | |
| | 3 | Equation of a circle | 2 | |
| DEC | 4 | Intersection of a Sphere and a Line | 2 | |
| | 5 | Equation of a Tangent Plane | 2 | |
| | 6 | Angle of Intersection of Two Spheres | 2 | |
| 2 | | CONES | | |
| DEC | 1 | Introduction, Definition | 2 | 10 |
| | 2 | Condition that the General Equation of the Second Degree should represent a Cone | 3 | |
| JAN | 3 | Cone and a Plane through its Vertex | 5 | |
| 3 | | CONES AND CYLINDERS | | |
| JAN | 1 | Intersection of a line with a cone,Intersection of Two Cones with a Common Vertex | 4 | 12 |
| | 2 | Right Circular Cone | 3 | |
| | 3 | The Cylinder,Right Circular Cylinder | 4 | |
| | 4 | Enveloping cylinder | 1 | |
| 4 | | CONICOIDS | | |
| FEB | 1 | The general equation of the Second Degree | 2 | 10 |
| | 2 | Central conicoids | 2 | |
| | 3 | Intersection,of the Line with a Conicoid | 1 | |
| MAR | 4 | Tangent line, Tangent planes and normal to conicoid | 5 | |
| GRAND TOTAL | | | | 45 |

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Sainikpuri, Secunderabad-500094
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Affiliated to Osmania University
TEACHING PLAN: 2018-19
Program: B. Sc (M/E//P/S/Cs)
Paper Title: MT621: NUMERICAL ANALYSIS**

| | | |
|---|--|--|
| <u>DEPARTMENT OF MATHEMATICS AND STATISTICS</u> | <u>YEAR/ SEMESTER</u> <u>III/VI</u> | <u>NO.OF CLASSES PER WEEK</u> <u>3 HRS PER WEEK(45)</u> <u>PRACTICALS 2 CLASSES PER</u> <u>WEEK</u> |
|---|--|--|

| MONTH | UNIT | TOPIC | NUMBER OF CLASSES |
|----------|------|---|---------------------------|
| NOVEMBER | | Introduction, definitions of operators, relation between operators | 2 |
| DECEMBER | II | Differences of a polynomial, Newton's formulae for interpolation. | 3 |
| | | Central Difference formulae (Gauss formulae ,Stirling's) | 4 |
| | | Separation of symbols | 2 |
| | | Revision | 2 |
| | III | Lagrange's interpolation formula | 4 |
| JANUARY | III | Newton's Divided difference | 3 |
| | | Neville's method,. | 2 |
| | | Hermite's interpolation formula | 2 |
| | | Revision | 2 |
| | | IV | Numerical Differentiation |
| FEBRUARY | IV | Numerical Integration – Trapezoidal rule , Simpson's 1/3 rule. | 3 |
| | | 2 | 2 |
| | | Simpson's 3/8 rule, Boole's Rule. | 2 |
| | | Weddle's rules , Romberg integration. | 2 |
| | | Revision | 3 |
| FEBRUARY | I | Introduction, Bisection method, Fixed point iteration(iteration method) | 3 |
| | | Newton's method and it's extension (Newton Raphson method and Generalised Newton's) | 2 |
| | | MARCH | Muller's method. |
| MARCH | | Revision | 1 |

Total - 45



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**ACADEMIC ORGANISER 18-19
Skill Enhancement Course-SEM4**

LOGIC AND SETS

CLASSES PER WEEK - 2

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|-----------|----------|---|---------------------|---------------|
| UNIT1 | | | | |
| NOV | 1 | Basic connectives and truth tables | 4 | 15 |
| | 2 | logical equivalence: Laws of logic | 4 | |
| DEC | 3 | Rules inference :The use of quantifiers, Quantifiers | 4 | |
| | 4 | Definitions and proofs of theorems. | 3 | |
| UNIT2 | | | | |
| JAN | 1 | Sets and subsets, Set operations and the laws of set theory | 6 | 15 |
| | 2 | counting and Venn diagrams | 4 | |
| JAN & FEB | 3 | The axioms of probability, Conditional probability, independence –discrete random variables | 5 | |
| | | TOTAL | 30 | 30 |



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ACADEMIC ORGANISER 18-19

Skill Enhancement Course-SEM6

NUMBER THEORY

CLASSES PER WEEK - 2

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|----------|----------|---|---------------------|---------------|
| UNIT1 | | | | |
| JUNE | 1 | The division algorithm, number patterns | 2 | 15 |
| JULY | 2 | prime and composite numbers, Fibonacci and Lucas' numbers | 4 | |
| | 3 | Fermat numbers, GCD | 4 | |
| AUG | 4 | LCM, Linear concurrences | 5 | |
| UNIT2 | | | | |
| AUG | 1 | Divisibility tests, Modular designs | 2 | 15 |
| | 2 | Check digits, The Chinese Remainder Theorem | 4 | |
| SEP | 3 | Wilson's theorem | 4 | |
| | 4 | Fermat's Theorem, Euler's Theorem | 5 | |
| | | TOTAL | | |

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**ACADEMIC ORGANISER 18-19
Skill Enhancement Course-SEM3**

THEORY OF EQUATIONS

CLASSES PER WEEK-3

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|-----------|----------|--|---------------------|---------------|
| UNIT1 | | | | |
| JUNE | 1 | Graphic representation of a polynomial | 1 | 15 |
| | 2 | Maxima and minima of polynomials | 1 | |
| | 3 | Theorems relating to the real roots of equations | 4 | |
| JULY | 4 | Existence of a root in the general equation, Imaginary roots | 4 | |
| | 5 | Theorem determining the number of roots of an equation, Equal roots, Imaginary roots | 4 | |
| | 6 | Descarte's rule of signs for positive roots and negative roots. | 1 | |
| UNIT2 | | | | |
| AUG | | Relations between the roots and coefficients | 3 | 15 |
| | | Theorems , Application of the Theorem | 2 | |
| AUG & SEP | | Depression of an equation when a relation exists between two of it's roots | 3 | |
| | | The cube roots of unity | 4 | |
| | | Symmetric Functions of the roots | 3 | |
| | | TOTAL | 30 | 30 |

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ACADEMIC ORGANISER 18-19

Skill Enhancement Course-SEM5

GRAPH THEORY

CLASSES PER WEEK-2

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|----------|----------|--|---------------------|---------------|
| UNIT1 | | | | |
| JUNE | 1 | Definition of Graph & Basic properties | 6 | 15 |
| | 2 | Examples of graphs, | 2 | |
| JULY | 3 | Isomorphism of graphs. | 7 | |
| UNIT2 | | | | |
| | 1 | Paths and circuits | 3 | 15 |
| AUG | 2 | Eulerian circuits | 3 | |
| | 3 | Hamiltonian cycles, adjacency matrix | 4 | |
| SEP | 4 | shortest path algorithm | 5 | |
| | | | | 30 |

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ACADEMIC ORGANISER 18-19

SEM-6 GENERIC ELECTIVE II G1E621

CLASSES PER WEEK-2

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|-----------|----------|---|---------------------------|------------------|
| UNIT1 | | | | |
| Nov&Dec | 1 | Time and work | 10 | 20 |
| Dec & Jan | 2 | Time and distance | 10 | |
| UNIT2 | | | | |
| Feb | 1 | Methods of solving equations in one variable. | 10 | 10 |
| | | Total | 30 | 30 |



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ACADEMIC ORGANISER 18-19

SEM-5 GENERIC ELECTIVE I GE521

CLASSES PER WEEK - 2

| UNIT NO. | SUB UNIT | TOPICS | PERIODS PER SUBUNIT | TOTAL PERIODS |
|-----------|----------|---------------------|---------------------------|------------------|
| UNIT1 | | | | |
| June | 1 | Percentages | 4 | 20 |
| July | 2 | Averages | 6 | |
| Aug | 3 | Ratio | 5 | |
| | 4 | Proportion | 5 | |
| UNIT2 | | | | |
| Aug & Sep | 1 | Modular Arithmetics | 10 | 10 |
| | | Total | 30 | 30 |

