SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VIJAYAWADA - 10.
(An autonomous college in the jurisdiction of Krishna University, Machilipatnam, A.P. India.)
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MATHEMATICS	MAT 11A	2020-21	B.Sc. (MPC,MSCS,MPCS,MECS,MSCA,MCCS)

==SEMESTER-I==   **No of Credits: 5**

DIFFERENTIAL EQUATIONS ==(NEW SYLLABUS)==

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER& FIRST DEGREE (18 Hrs) OFFLINE TEACHING

1.1   Linear Differential Equations

1.2   Differential Equations Reducible to Linear Form, Bernoulli's differential equations.

1.3   Exact Differential Equations

1.4   Integrating Factors, 1/Mx+Ny, 1/Mx-Ny, $e^{\int f(x)}dx, e^{\int g(y)}dy, and\ Inspection\ method$

1.5   Change of Variables

UNIT-II: ORTHOGONAL TRAJECTORIES & DIFFERENTIAL EQUATIONS OF FIRST ORDER BUT NOT FIRST DEGREE   ONLINE TEACHING   (12 Hrs)

2.1   Orthogonal Trajectories

2.2   Self Orthogonal Trajectories

2.3   Equations solvable for p

2.4   Equations solvable for y

2.5   Equations solvable for x

2.6   Equations Homogeneous in X & Y

2.7   Equations that do not contain x (or y)

2.8   Clairaut's Equation and Equations reducible to clairaut's form.

UNIT – III :Higher order linear differential equations-I   (12Hrs) OFFLINE TEACHING

3.1   Solution of homogeneous linear differential equations of order n with constant coefficients

3.2   Solution of the non-homogeneous linear differential equations with constant coefficients by means of   polynomial operators.

3.3   General Solution of f(D)y=0

3.4   General Solution of f(D)y=Q when Q is a function of x.

3.5 $\dfrac{1}{f(D)}$ is Expressed as partial fractions.

3.6   P.I. of f(D)y = Q when Q= be^{ax}

3.7   P.I. of f(D)y = Q when Q is b sin ax or b cosax.

UNIT – IV: Higher order linear differential equations-II   ONLINE TEACHING (12 Hrs)

4.1   Solution of the non-homogeneous linear differential equations with constant coefficients.

4.2   P.I. of f(D)y = Q when Q= bx^{k}

4.3   P.I. of f(D)y = Q when Q= $e^{ax}V$

4.4   P.I. of f(D)y = Q when Q= xV

4.5   P.I. of f(D)y = Q when Q= $x^{m}V$ where v = sin bx and cos bx

UNIT-V: Higher order Differential Equations –III   ONLINE TEACHING   (12 Hrs)

5.1   The Cauchy-Euler Equation.

5.2   Linear differential Equations with non-constant coefficients

5.3   Method of Variation of parameters.

PRESCRIBED TEXT BOOK:
- V.Krishna Murthy: A text book of mathematics for B.A/B.ScVol – I, S-Chand&co,2015

REFERENCE BOOKS:
- Dr. A. Anjaneyulu -A text book of mathematics for B.A/B.ScVol – I- Deepthi Publications-2015
- RaiSinghania- Ordinary& Partial Differential Equations- S-Chand-2009
- ZafarAhsan- Differential Equations and their applications- Prentice-Hall of India Pvt Ltd, McGraw Hill-2000

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MATHEMATICS	MATT29	2020-21	B.Sc (MPC,MSCS,MPCS, MECS,MSCA,MCCS)

Course: II

No. of Credits: 5

REAL ANALYSIS (NEW SYLLABUS) (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to

1. get clear idea about the real numbers and real valued functions.
2. obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. test the continuity and differentiability and Riemann integration of a function.
4. know the geometrical interpretation of mean value theorems.

UNIT – I (12 Hours)

REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supremum property; intervals. (No question is to be set from this portion).

Real Sequences:

Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT –II (12 Hours)

INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test

2. Cauchy's nth root test or Root Test.

3. D'-Alemberts' Test or Ratio Test.

4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence.

UNIT – III (12 Hours)

CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).

Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV (12 Hours)
DIFFERENTIATION AND MEAN VALUE THEORMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – V (12 Hours)

RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Real Analysis and its applications / Problem Solving.

Text Book:

 Introduction to Real Analysis by Robert G.Bartle and Donlad R. Sherbert, published by John

Wiley.

Reference Books:

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

2. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania, published by S. Chand & Company Pvt. Ltd., New Delhi.

MATHEMATICS	AMATT 41A	2020-21	B.Sc (MPC,MSCS,MPCS, MECS,MSCA,MCCS)

Course: IV
No. of credits: 5

LINEAR ALGEBRA (NEW SYLLABUS)(75Hrs)

Course Outcomes:

After successful completion of this course, the student will be able to;

1. understand the concepts of vector spaces, subspaces, basises, dimension and their properties

2. understand the concepts of linear transformations and their properties

3. apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. learn the properties of inner product spaces and determine orthogonality in inner product spaces.

UNIT – I (12 Hours)

Vector Spaces-I:

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II (12 Hours)

Vector Spaces-II:

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III (12 Hours)

Linear Transformations:

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV (12 Hours) Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic equations, Characteristic Values & Vectors of square matrix, Cayley – Hamilton Theorem.

UNIT –V (12 Hours) Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram

– Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Linear algebra and its applications / Problem Solving.

Text Book:

Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

Reference Books :

1. Matrices by Shanti Narayana, published by S.Chand Publications.

2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition),New Delhi.
3. Linear Algebra by Stephen H. Friedberg et. al. published by Prentice Hall of India Pvt. Ltd. 4th Edition, 2007.

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MATHEMATICS	MAT T02	2020-21	B.Sc (MPC,MSCS,MPCS,MECS,MSCA,MCCS)

SEMESTER- IV   Course: V
                                                                                     No. of Credits:
5

THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY (NEW SYLLABUS)

UNIT – I (12Hours)

The Plane:

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT – II (12 Hours)

The Line :

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The

shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.

UNIT – III (12 Hours)

The Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle

Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes

UNIT – IV (12 Hours)

The Sphere and Cones :

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone

UNIT – V (12 hrs)

Cones :

Enveloping cone of a sphere; right circular cone: equation of the right circular cone with a given vertex, axis and semi vertical angle: Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.

MATHEMATICS	MAT T16	2020 – 21	B.Sc (MSDS)

NUMERICAL ANALYSIS & SPECIAL FUNCTIONS (NEW SYLLABUS)

SEMESTER-I   **No of Credits: 5**

OBJECTIVES: 1. TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

UNIT I : FINITE DIFFERENCES   **(18 hrs)**
1.1 Operators   ,   and E-problems related. **(OFF LINE)**
1.2 Fundamental theorem of finite differences. **(ONLINE)**
1.3 Missing terms problems. **(ONLINE)**
1.4 Newton's Gregory Forward interpolation formula derivation and problems related. **(ONLINE)**
1.5 Newton Gregory backward interpolation formula derivation and problems related. **(ONLINE)**

UNIT II: DIVIDED DIFFERENCES   **(18 hrs)**
2.1 Divided differences definition and properties problems related. **(ONLINE)**
2.2 Newton's divided difference formula derivation and problems related. **(ONLINE)**
2.3 Lagrange's interpolation formula derivation and problems related. **(ONLINE)**
2.4 Relation between divided differences and forward, backward differences. **(OFF LINE)**
2.5 Lagrange's Inverse interpolation formula derivation and problems related. **(OFF LINE)**

UNIT III: CENTRAL DIFFERENCES   **(18 hrs)**
3.1 Central difference operators related problems. **(OFF LINE)**
3.2 The Gauss Forward and Gauss Backward formula derivations and problems related. **(ONLINE)**
3.3 Stirling's formula derivation and problems related. **(ONLINE)**
3.4 Bessel's formula problems only. **(OFF LINE)**
3.5 Everett's formula problems only. **(OFF LINE)**

UNIT IV: BETA AND GAMMA FUNCTIONS   **(18 hrs)**
4.1 Gamma function definition properties and problems related. **(ONLINE)**
4.2 Beta function definition properties. **(ONLINE)**
4.3 Relation between Beta and Gamma functions problems related. **(OFF LINE)**
4.4 Other forms of Beta integral problems related. **(OFF LINE)**
4.5 Legendre's duplication formula. **(OFF LINE)**

UNIT V: BESSEL'S EQUATIONS   **(18 hrs)**
5.1 Bessel's differential equation and definition. **(ONLINE)**
5.2 Recurrence relations and related problems. **(ONLINE)**
5.3 Generating function of Bessel's equation. **(OFF LINE)**
5.4 Problems on Bessel's differential equations. **(OFF LINE)**
Note: Number of hours required for Online is 25 hour

MATHEMATICS	MAT T51	2018-19	B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS, M.S.CA)

RING THEORY & VECTOR CALCULUS

SEMESTER-V 　　　　　　　　PAPER - V 　　　　　　　　**No of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT – 1: RINGS & SUB RINGS: 　　　　ONLINE TEACHING 　　**(12 hrs)**
1.1 Definition of Ring and basic properties, Boolean Rings
1.2 Divisors of zero and cancellation laws in a Ring, Integral Domains, Division Ring and Fields
1.3 The characteristic of a ring – Definition – Theorems.
1.4 Sub Rings – theorems- related problems.

UNIT – 2: IDEALS & HOMOMORPHISMS. 　　ONLINE TEACHING 　**(18 hrs)**
2.1 Ideals and Principal ideals – theorems and related problems.
2.2 Maximal Ideals & Prime Ideals.
2.3 Definition of Homomorphism, types of Homomorphism, Elementary Properties of Homomorphism.
2.4 Homomorphic image – theorems- related problems.
2.5 Problems on Homomorphisms and Isomorphisms.
2.6 Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

UNIT –3: VECTOR DIFFERENTIATION 　　ONLINE TEACHING 　**(15 hrs)**
3.1 Vector point function – definition – ordinary derivatives of vectors and properties.
3.2 Vector differential operator 　, gradient of a scalar point function – properties – problems on grad f.
3.3 Divergence & Curl operators – Solenoidal & Irrotational vectors – related problems.
3.4 Vector identities – related problems.

UNIT – 4 : VECTOR INTEGRATION 　　OFFLINE TEACHING 　**(15 hrs)**
4.1 Definition of Line Integral – related problems.
4.2 Definition of Surface Integral – related problems.
4.3 Definition of Volume integral – related problems.

UNIT – 5: APPLICATIONS OF VECTOR INTEGRATION 　OFFLINE TEACHING **(15 hrs)**
5.1 Green's theorem in a plane – related problems
5.2 Gauss Divergence theorem – related problems.
5.3 Problems on Stoke's theorem only.

Prescribed Text books:
1. V. Venkateswara Rao, N. Krishna Murthy. A text book of mathematics for B.A / B.Sc Volume – II (Unit – II). Pg: 187 - 290 S-Chand & Co2014.
2. V. Venkateswara Rao, N. Krishna Murthy, A text book of mathematics for B.A / B.Sc Volume – III (Unit – III & IV). 　　Pg: 227 – 385, S-Chand & Co, 2012

Reference books:
1. Dr. A. Anjaneyulu, A text book of mathematics for B.A/B.ScVol – III, Deepthi Publications, 3rd Edition 　　　2006 – 2007
2. Dr. A. Anjaneyulu, A text book of mathematics for B.A/B.ScVol – I, Deepthi Publications, 4th Edition 2004 – 2005
3. A.R. Vashistha & A.K Vashistha, Modern Algebra, Krishna Prakashan Media Ltd., 2007

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MATHEMATICS	MAT T52	2018-19 onwards	B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS, M.S.CA)

LINERA ALGEBRA
SEMESTER-V   PAPER - VI   No of Credits: 5
OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS AND APPLICATION SKILLS.
UNIT I: Vector spaces   ONLINE TEACHING   (15hrs)
1.1 Vector space definition – general properties of Vector space.
1.2 subspace definition – theorems & related problems.
1.3 Linear sum of two subspaces, linear combination of vectors and linear span of a set – theorems & related problems.
1.4 Linear dependence of vectors - theorems & related problems.
1.5 Linear independence of vectors - theorems & related problems.
UNIT II: Basis and Dimension   ONLINE TEACHING (12hrs)
2.1 Basis of a vector space – definition, Basis existence, Basis extension, Basis Invariance, theorems.
2.2 Coordinates – definition & related problems.
2.3 Dimension of a vector space, dimension of a subspace - theorems & related problems.
2.4 Quotient space, dimension of Quotient space - theorems.
UNIT III: Linear Transformation   OFFLINE TEACHING   (12hrs)
3.1 Vector space homomorphism – definitions
3.2 Linear transformation, Properties of L.T., Determination of L.T. - theorems & related problems.
3.3 sum of linear transformations, scalar multiplication of L.T., product of linear transformations, Algebra of linear operators - theorems & related problems.
3.4 Range & Null space of a L.T. – Definitions, theorems & related problems.
3.5 Rank nullity theorem - related problems.
UNIT IV: Matrices   ONLINE TEACHING (24hrs)
4.1 Fundamentals of Matrices.
4.2 Elementary matrix operations & elementary matrices.
4.3 Rank of a matrix – definition, related problems.
4.4 Echelon form of a matrix, reduction to normal form, PAQ form, Inverse of a matrix - related problems only.
4.5 System of linear equations – homogeneous & non homogeneous linear equations - related problems.
4.6 Eigen values & Eigen vectors of a matrix – definitions, theorems & related problems.
4.7 Cayley - Hamilton theorem, related problems.
UNIT V: Inner product spaces   OFFLINE TEACHING   (12hrs)
5.1 Inner product spaces – definition, Norm (or) Length of a vector - theorems & related problems.
5.2 Schwarz in equality, Triangle inequality, parallelogram law – theorems.
5.3 Orthogonality – orthogonal, orthonormal vectors, orthogonal set, orthonormal sets of I.P.S - theorems & related problems.
5.4 Gram- Schmid orthogonalisation process, Bessel's Inequality and Parseval's Identity.

PRESCRIBED TEXT BOOK:
    1. V. Venkateswara Rao, N. Krishna Murthy.- A text book of Mathematics for B.A/B.Sc Vol – III. (Pg No: 111-192; 232 – 321 & 339 – 389; 395 – 434)- S-Chand & Co. 2006
REFERENCE TEXT BOOKS:
- J.N. Sharma and A. R. Vasistha- Linear Algebra- Krishna Prakashan Mandir Meerut- 250002.
- Dr.A. Anjaneyulu- A Text Book of Mathematics B.A/B.Sc – Vol III- Deepthi Publications- 3rd Edition 2006 – 2007.

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MATHEMATICS	MATT44A	2020-21	B.Sc.(MSDS)

DIFFERENTIAL EQUATIONS

SEMESTER-IV   **No. of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER& FIRST DEGREE (18 Hrs)   OFFLINE TEACHING

1.1   Linear Differential Equations

1.2   Differential Equations Reducible to Linear Form, Bernoulli's differential equations.

1.3   Exact Differential Equations

1.4   Integrating Factors, 1/Mx+Ny, 1/Mx-Ny, $e^{\int f(x)}dx, e^{\int g(y)}dy, and\ Inspection\ method$

1.5   Change of Variables

UNIT-II: ORTHOGONAL TRAJECTORIES & DIFFERENTIAL EQUATIONS OF FIRST

ORDER BUT NOT FIRST DEGREE   ONLINE TEACHING   (12 Hrs)

2.1   Orthogonal Trajectories

2.2   Self Orthogonal Trajectories

2.3   Equations solvable for p

2.4   Equations solvable for y

2.5   Equations solvable for x

2.6   Equations Homogeneous in X & Y

2.7   Equations that do not contain x (or y)

2.8   Clairaut's Equation and Equations reducible to clairaut's form.

UNIT – III : Higher order linear differential equations-I   (12Hrs) OFFLINE TEACHING

3.1   Solution of homogeneous linear differential equations of order n with constant coefficients

3.2   Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

3.3   General Solution of f(D)y=0

3.4   General Solution of f(D)y=Q when Q is a function of x.

3.5 $\dfrac{1}{f(D)}$ is Expressed as partial fractions.

3.6   P.I. of f(D)y = Q when Q= be^{ax}

3.7   P.I. of f(D)y = Q when Q is b sin ax or b cosax.

UNIT – IV: Higher order linear differential equations-II   **ONLINE TEACHING**   **(12 Hrs)**

4.1   Solution of the non-homogeneous linear differential equations with constant coefficients.

4.2   P.I. of f(D)y = Q when Q= bx^k

4.3   P.I. of f(D)y = Q when Q= $e^{ax}V$

4.4   P.I. of f(D)y = Q when Q= xV

4.5   P.I. of f(D)y = Q when Q= x^mV where v = sin bx and cos bx

UNIT-V: Higher order Differential Equations –III   **ONLINE TEACHING** **(12 Hrs)**

5.1   The Cauchy-Euler Equation.

5.2   Linear differential Equations with non-constant coefficients

5.3   Method of Variation of parameters.

PRESCRIBED TEXT BOOK:
- V.Krishna Murthy: A text book of mathematics for B.A/B.ScVol – I, S-Chand&co,2015

REFERENCE BOOKS:
- Dr. A. Anjaneyulu -A text book of mathematics for B.A/B.ScVol – I- Deepthi Publications-2015
- RaiSinghania- Ordinary& Partial Differential Equations- S-Chand-2009
- ZafarAhsan- Differential Equations and their applications- Prentice-Hall of India Pvt Ltd, McGraw Hill-2000

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MATHEMATICS MATTEL61 2017 – 18 Onwards B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS, M.S.CA , MCCS)

NUMERICAL ANALYSIS

SEMESTER-VI PAPER – VII (ELECTIVE) No of Credits: 5

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

UNIT-I: FINITE DIFFERENCES & INTERPOLATION WITH EQUAL INTERVALS (15 Hrs)

1.1. Introduction of finite differences, Formulae, Operator and differences tables.

1.2. Fundamental theorem of difference calculus.

1.3. Missing terms and Factorial notation.

1.4. Differences of zeros.

1.5. Newton forward interpolation formula, theorem and related problems.

1.6. Newton backward interpolation formula, theorem and related problems.

UNIT-II : INTERPOLATION WITH UNEQUAL INTERVALS (15 hrs)

2.1. Divided differences, Properties and Related problems.

2.2. Relation between divided differences, Forward, Backward and Central difference.

2.3. Newton's divided difference theorem and related problems.

2.4. Lagrange's interpolation with unequal intervals theorem and related problems.

UNIT-III : CENTRAL DIFFERENCE INTERPOLATION FORMULAE (15 hrs)

3.1. Gauss's forward difference formulae and problems.

3.2. Gauss's backward difference formulae and problems.

3.3. Stirling's central difference formulae and problems.

3.4. Bessel's formulae and problems.

3.5. Everett's formulae and problems.

UNIT-IV: INVERSE INTERPOLATION (15 hrs)

4.1. Introduction.

4.2. Lagrange's Method and related problems.

4.3. Successive Approximation Method and related problems.

UNIT-V: SOLUTION OF ALGEBRAIC AND TRANSCEDENTAL EQUATIONS (15 hrs)

5.1. Bisection Method and related problems.

5.2. Iteration Method and related problems.

5.3. False Position Method and related problems.

5.4. Newton Raphson Method and related problems.

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MATHEMATICS MATTCL66 2017 – 18 Onwards B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS,

M.S.CA, MCCS)

SPECIAL FUNCTIONS

SEMESTER-VI PAPER – VIII (B – 3) CLUSTER ELECTIVE No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS & APPLICATION SKILLS.

UNIT – I: BETA AND GAMMA FUNCTIONS (15 hrs)

1.1 - Definition

1.2 - Elementary properties of gamma functions

1.3 - Transformation of Beta functions

1.4 - Another form of Beta and Gamma functions

1.5 - Relation between Beta and Gamma functions

1.6 - Other transformations, important results

UNIT –II: BESSEL'S EQUATION (15 hrs)

2.1 - Bessel's Equation

2.2 - Definition of (x)

2.3 - Recurrence formula for (x)

2.4 - Generating function for (x)

2.5 – General problems on (x)

UNIT - III: LEGENDRE'S EQUATION (15 hrs)

3.1 - Legendre's equation (Def)

3.2 - Definition of (x)

3.3 - Generating Function.

3.4 - Orthogonal properties of Legendre's polynomials

3.5 - Recurrence formulae

3.6 - Rodrigue's formula

3.7 - To find first few Legendre's polynomials.

UNIT – IV: HERMITE POLYNOMIALS (15 hrs)

4.1 – Hermite differential equation

4.2 – Hermite 's polynomials

4.3 – Generating function

4.4 – Other forms for Hermite polynomials

4.5 – Rodrigue's formula

4.6 – To find first few Hermite polynomials

4.7 – Orthogonal properties for Hermite polynomials

4.8 - Recurrence formula for Hermite polynomials

(P.T.O)

UNIT – V: LAGUERRE POLYNOMIALS (15 hrs)

5.1 - Laguerre's differential equation

5.2 - Laguerre polynomials

5.3 – Generating function

5.4 – Other forms for Laguerre polynomials

5.5 – Rodrigue's formula

5.6 – To find first few Laguerre polynomials

5.7 – Orthogonal properties for Laguerre polynomials

5.8 – Recurrence formula for Laguerre polynomials.

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MATHEMATICS MATTCL65 2017 – 18 Onwards B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS, M.S.CA, MCCS)

GRAPH THEORY   SEMESTER-VI PAPER – VIII (B – 2) CLUSTER ELECTIVE No of Credits: 5   No of Hrs : 75

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS & APPLICATION SKILLS.

Unit I: Graphs and Subgraphs (15 hrs)

1.1 Graphs, Simple Graph, Multiple Graph, Undirected and Directed graph, degree of vertex, the Handshaking theorem.

1.2 Travelling Salesman problem, types of Graphs

1.3 Subgraphs and Isomorphism of graphs

1.4 Operations of graphs.

1.5 Adjacency and Incidence matrix

Unit II : Connectivity (15hrs)

2.1 Paths, cycles, connectivity

2.2 Connectedness in undirected graph

2.3 Cut vertex, cutset, bridge

2.4 Connectedness in directed graphs

2.5 Edge connectivity.

Unit III: Eulerian Graphs&Hamilton Graphs (15hrs)

3.1 Eulerian graph: Definitions- Eulerian graph , Eulerian trail, Eulerian Circuit, Euler Circuit, Euler path

3.2 Theorems on Eulerian graphs – related problems

3.3 Fleury's Algorithm- related problems

3.4 Hamilton graph: Definitions-Hamilton circuits, Hamilton path, Hamilton graph

3.5 Theorems on Hamliton graphs- related problems

Unit IV: Trees (15hrs)

4.1 Trees, properties, distance and centres in trees

4.2 Rooted and binary trees, Spanning tree

4.3 Algorithms for constructing spanning trees- BFS and DFS algorithms

4.4 Cayley's theorem

Unit V : Spanning tree (15hrs)

5.1 Weighted graph, minimal spanning trees Kruskal's algorithm and Prim's algorithm

5.2 Tree traversal

5.3 Representation of algebraic structure by binary tree

PRESCRIBED BOOK:

A Text Book of Discrete Mathemaics by Dr.Swapan Kumar Sankar, published by S.Chand& Co.

Publishers, New Delhi

REFERENCE BOOKS :

1. Graph theory with Applicationsby J.A.Bondy and U.S.R.Murthy published by

Mac.Millan Press

2. 2. Introduction to Graph theory by S.Arumugham and S.Ramachandran, published by

Scitech Publications, Chennai-17

3. **Graph theory and combinations by H.S.Govinda Rao published**

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA:VIJAYAWADA

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS MATTCL64 2017 – 18 Onwards B.Sc.(M.P.C, M.S.CS, M.PCS, M.E.CS, M.S.CA, MCCS)   DISCRETE MATHEMATICS

SEMESTER-VI   PAPER – VIII (B – 1) CLUSTER ELECTIVE No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS & APPLICATION SKILLS.

UNIT – I: SETS, FUNCTIONS, RELATIONS AND LOGIC. (15 hrs)

1.1 Sets and Operations of sets.

1.2 Relations and Functions.

1.3 Fundamentals of Logic.

1.4 Logical Inferences.

1.5 Methods of Proof of an implication.

1.6 First order logic and other methods of proof.

1.7 Rules of inferences for quantified propositions.

UNIT – II: COUNTING PRINCIPLES (15 hrs)

2.1 Basics of Counting.

2.2 Combinations and Permutations.

2.3 Enumeration of Combinations and Permutations.

2.4 Enumerating Combinations and Permutations with repetitions.

2.5 Enumerating Permutations with Constrained repetitions.

UNIT – III: MATHEMATICAL INDUCTION, PRINCIPLE OF INCLUSION – EXCLUSION

AND MULTINOMIAL THEOREMS. (15 hrs)

3.1 Mathematical Induction

3.2 The Principle of Inclusion – Exclusion.

3.3 Binomial Coefficients

3.4 The binomial & Multinomial Theorems.

(P.T.O)

UNIT – IV: RECURENCE RELATIONS (15 hrs)

4.1 Generating functions of sequences

4.2 Calculation coefficients of generating functions.

4.3 Recurrence relations.

4.4 Solving recurrence relations by substitution and generating functions.

4.5 The method of Characteristic roots.

UNIT – V: BOOLEAN ALGEBRA (15 hrs)

5.1 Introduction

5.2 Boolean Algebra

5.3 Boolean Functions

5.4 Switching Mechanisms

5.5 Minimization of Boolean functions.

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MATHEMATICS MATT57 **2019 – 20** **Onwards B.Sc.(MSDS)**

SPECIAL FUNCTIONS **SEMESTER-V No of Credits: 5**

OBJECTIVE: TO ENHANCE THE ANALYTICAL SKILLS & APPLICATION SKILLS.

UNIT – I: BETA AND GAMMA FUNCTIONS (15 hrs)

1.1 - Definition

1.2 - Elementary properties of gamma functions

1.3 - Transformation of Beta functions

1.4 - Another form of Beta and Gamma functions

1.5 - Relation between Beta and Gamma functions

1.6 - Other transformations, important results

UNIT –II: BESSEL'S EQUATION (15 hrs)

2.1 - Bessel's Equation

2.2 - Definition of (x)

2.3 - Recurrence formula for (x)

2.4 - Generating function for (x)

2.5 – General problems on (x)

UNIT - III: LEGENDRE'S EQUATION (15 hrs)

3.1 - Legendre's equation (Def)

3.2 - Definition of (x)

3.3 - Generating Function.

3.4 - Orthogonal properties of Legendre's polynomials

3.5 - Recurrence formulae

3.6 - Rodrigue's formula

3.7 - To find first few Legendre's polynomials.

UNIT – IV: HERMITE POLYNOMIALS (15 hrs)

4.1 – Hermite differential equation

4.2 – Hermite 's polynomials

4.3 – Generating function

4.4 – Other forms for Hermite polynomials

4.5 – Rodrigue's formula

4.6 – To find first few Hermite polynomials

4.7 – Orthogonal properties for Hermite polynomials

4.8 - Recurrence formula for Hermite polynomials

(P.T.O)

UNIT – V: LAGUERRE POLYNOMIALS (15 hrs)

5.1 - Laguerre's differential equation

5.2 - Laguerre polynomials

5.3 - Generating function

5.4 - Other forms for Laguerre polynomials

5.5 - Rodrigue's formula

5.6 - To find first few Laguerre polynomials

5.7 - Orthogonal properties for Laguerre polynomials

5.8 - Recurrence formula for Laguerre polynomials.

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MATHEMATICS MATT56 2019-20 B.Sc.(MSDS)

NUMERICAL ANALYSIS   SEMESTER- No of Credits: 5

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

UNIT-I: FINITE DIFFERENCES & INTERPOLATION WITH EQUAL INTERVALS (18rs)

1.1. Introduction of finite differences, relation between difference Operators and differences tables.

1.2. Fundamental theorem of difference calculus.

1.3. Missing terms and Factorial notation.

1.4. Newton forward interpolation formula, theorem and related problems.

1.5. Newton backward interpolation formula, theorem and related problems.

UNIT-II : INTERPOLATION WITH UNEQUAL INTERVALS (18hrs)

2.1. Divided differences, Properties and Related problems.

2.2. Relation between divided differences, Forward, Backward and Central difference.

2.3. Newton's divided difference theorem and related problems.

2.4. Lagrange's interpolation with unequal intervals theorem and related problems.

UNIT-III : CENTRAL DIFFERENCE INTERPOLATION FORMULAE (18 hrs)

3.1. Gauss's forward difference formulae and problems.

3.2. Gauss's backward difference formulae and problems.

3.3. Stirling's central difference formulae and problems.

3.4. Bessel's formulae and problems.

3.5. Everett's formulae and problems.

UNIT-IV: INVERSE INTERPOLATION (18 hrs)

4.1. Introduction.

4.2. Lagrange's Method and related problems.

4.3. Successive Approximation Method and related problems.

UNIT-V: SOLUTION OF ALGEBRAIC AND TRANSCEDENTAL EQUATIONS (18hrs)

5.1. Bisection Method and related problems.

5.2. Iteration Method and related problems.

5.3. False Position Method and related problems.

5.4. Newton Raphson Method and related problems.

Prescribed Text book:

1. Calculus of finite differences and Numerical analysis Gupta & Malik - Krishna Prakasan Mandir – Merrut- 1992

Reference Text books:

Numerical analysis by S.S.Sastry- - Prentice Hall of India Private Limited. New Age International Publishers- Pragati Prakashan.- 1999.

Numerical ana

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA:VIJAYAWADA

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MATHEMATICS MAT T13 2018-19 B.Sc. Hon's(Comp. Science)

SEMESTER – I Paper-I No. of credits : 3

Course Objectives: 1 .To improve the analytical and logical thinking of the student

2. Application of logical reasoning to the variety problems

Pre-requisites : Basic knowledge in calculus of intermediate or equivalent

SEQUENCE SERIES & LIMITS AND CONTINUITY

UNIT-I (SEQUENCE) : Sequences-limit point and limit of a sequence-convergence, divergence and oscillation of sequences-monotonic sequences-Cauchy sequence- general principle of convergence – limit superior and limit inferior of sequences – subsequence's.

UNIT-II (SERIES) : Infinite series-partial sums-series of non-negative terms- Tests of convergence-comparison – Ratio – Root-condensation and Integral tests-Alternative series-

Absolute and conditional convergence.

UNIT-III (LIMITS & CONTINUITY) : Limits – continuity – properties of continuous functions of one variable-Monotonic functions-uniform continuity.

Out come of the Course : The student acquires adequate knowledge in solving the Analytical problems.

Text Book Prescribed :

V.Venkateswara Rao, N. Krishna Murthy, B.V.S.S.Sarma, S. Anjaneya Sastry ,A Text Book of B.Sc. Mathematics ,Vol. II. , S.Chand&Co. Ltd. 15 th Revised Edition 2010.,

Recommended Reference Books :

Dr. A. Anjenyulu, A Text Book of Mathematics, Vol. II., Deepti publications. 1 st edition 2004.

J.N. Sharma & A.R. Vasishtha., Real Analysis., Krishna Prakashan Media(P) Ltd. 25 th edition (1995-'96).

Prof. U.M sowamy, Prof. K.P.R.Sastry, Prof. I.Ramabhadra Sarma.

B.A./B.Sc. II Year Mathematics., Telugu Akademy.,1 st Edition 2009lysis by G. Shankar Rao New Age International Publishers,2010

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA:VIJAYAWADA

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MATHEMATICS MAT T25 2018-19 B.Sc. Hon's(Comp. Science)

SEMESTER: II Paper-II No. of Credits: 3

Course Objectives: 1 .To improve the analytical and logical thinking of the student

2. Application of logical reasoning to the variety problems

3. Providing knowledge for finding areas and volumes of two

dimensional and three dimensional figures.

Pre-requisites : Basic knowledge in calculus and vector algebra of intermediate

or equivalent

DIFFERENTIATION, RIEMANN INTEGRATION& VECTOR DIFFERENTIATION AND INTEGRATION

UNIT-I:(DIFFERENTIATION)

Differentiation-Mean value theorems- Rolle's, Legrange's, Cauchy's, and Taylor's

UNIT-II:(RIEMANN INTEGRATION)

Riemann Integral – properties of Integrable functions-functions defined by integrals primitive

– Fundamental theorem – First and second mean value theorems.

UNIT-III:(VECTOR DIFFERENTIATION AND INTEGRATION)

Vector point function - limit - Derivative of a vector point function related concepts and

definitions - Problems - Vector Differential operator - Gradient - divergence - curl - related

problems - Vector Identities - Vector Differential Geometry - Vector Integration.

Line - Surface - Volume Integrals - Greens Gauss divergence theorems - stokes theorem

(without proof) - related problems

Out come of the Course : The student acquires adequate knowledge in solving the

Analytical and Critical problems.

Text Book prescribed:

V.Venkateswara Rao, N. Krishna Murthy, B.V.S.S.Sarma, S. Anjaneya

Sastry ,A Text Book of B.Sc. Mathematics ,Vol. II(2009). & III(2014),

S.Chand&Co. Ltd. 15 th Revised Edition 2010.,

Reference Books:

Prof. U.M. Swamy., Prof. K.P.R. Sastry & Prof. I.Ramabhadra Sarma.,

B.A./B.Sc. Second Year Mathematics, Telugu Akademi,1 st edition –

2009., Reprint – 2011.

Dipak Chatterjee., Real Analysis.,PHI learing private limited ,April 2012

Dr.B.Leela Lakshmi kumari, Prof.G.Chakradhara Rao, Prof.K.Rama Mohana Rao, Prof.N.Bhaskar Reddy.B.A./B.Sc. III Year Mathematics Telugu Akademy., 1 st edition 2010.

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MATHEMATICS MAT T43 2018 -19 B.Sc. Hon's(Comp. Science)

SEMESTER – IV PAPER – IV No. of credits : 4

DISCRETE MATHEMATICS – II

PART-A

I. RELATIONS AND DIGRAPHS :

1. Relations and Directed Graphs.

2. Special properties of Binary Relations.

1. Big O notation.

3. Equivalence relations.

1. The integers Modulo m

4. Ordering relations, Lattices, Enumerations.

1. Strings and orderings on strings.

5. Operations on relations.

6. Paths and closures.

7. Directed Graphs and Adjacency Matrices.

PART-B

II. GRAPHS

1. Baisc concepts.

2. Isomorphisms and subgraphs.

3. Trees and their properties.

4. Spanning trees.

5. Directed trees.

6. Binary trees.

7. Planar graphs.

8. Euler's graphs.

9. Multigraphs and Euler circuits.

10. Hamiltonian Graphs.

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ABSTRACT ALGEBRA (NEW SYLLABUS)(75Hrs SEMESTER-III No of Credits: 5

UNIT-I : GROUPS (12hrs)

1.1 Binary Operation, Semi group, Algebraic Structure, Monoid, Cancellation laws, Group

definition, Abelian group, Elementary Properties.

1.2 Finite and Infinite groups with examples, Order of a group with examples.

1.3 Addition modulo m – Definition – theorem – Problems.

1.4 Multiplication Modulo P – definition- {1, 2, 3,…….p-1} where P is a prime number is a
group

– theorem – Problems.

1.5 Order of an element of a group – Definition – Theorems.

UNIT-II: SUB GROUPS (12 hrs)

2.1 Complex definition, Multiplication of two complexes, Inverse of a complex, subgroup

definition, Identity and Inverse of a subgroup.

2.2 Criterion for a complex to be a subgroup, Criterion for the product of two subgroups to be

a subgroup.

2.3 Union and Intersection of subgroups.

2.4 Cosets Definition – Properties of cosets.

2.5 Index of a subgroups of a finite groups, Lagrange's Theorem.

UNIT-III: NORMAL SUBGROUPS (12hrs)

3.1 Definition of a normal subgroup, Proper and improper normal subgroups.

3.2 Intersection of two normal subgroups, Subgroup of index 2 is a normal subgroup, Simple

Group.

3.3 Quotient group,Criteria for the existence of a Quotient group.

UNIT-IV: HOMOMORPHISM (12hrs)

4.1 Definition of a Homomorphism, Image of a Homomorphism, Properties of a

Homomorphism.

4.2 Isomorphism, Automorphism definitions and elementary properties. 4.3 Kernel of a

homomorphism, Fundamental theorem on homomorphism of groups and

Applications.

4.4 Inner automorphism, Outer automorphism.

UNIT-V: PERMUTATIONS AND CYCLIC GROUPS (12 hrs)

5.1 Definition of a permutation group, Equal permutations, Permutation multiplications, Order of a

permutation, Inverse of a permutation, Orbits and cycles of permutation

5.2 Transposition, Even and odd permutations – Theorem – Related Problems.

5.3 Cayley's theorem – Related Problems.

5.4 Definition of a cyclic group – Properties of Cyclic group.

5.5 Standard theorems on cyclic groups – related problems.