A.S.D. Govt. Degree College for Women (Autonomous), Kakinada

(Accredited by NAAC with "B" in Cycle 3)

(Affiliated to Adikavi Nannayya University)

DEPARTMENT Of MATHEMATICS

BOARD of STUDIES

2019-20

A.S.D. GOVT.DEGREE COLLEGE FOR WOMEN(A), KAKINADA.
DEPARTMENT OF MATHEMATICS
B.Sc. FIRST YEAR MATHEMATICS SEMESTER –I SYLLABUS

Course Title : DIFFERENTIAL EQUATIONS
Course Code: MAT1301
Total No. of Teaching Hrs.: 60hrs.
Lecture: 6hrs. Credits: 5

UNIT – I(12hrs) Differential Equations of first order and first degree :
Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

UNIT – II (12 Hours),
  i)   Orthogonal Trajectories in Cartesian and polar form.
  ii)   **Differential Equations of first order but not of the first degree :**
Equations solvable for p; Equations solvable for y; Equations solvable for x; Equations that do not contain. x (or y); Equations of the first degree in x and y – Clairaut's Equation.

UNIT – III (12 Hours), Higher order linear differential equations-I :
Solution of homogeneous linear differential equations of order n with constant coefficients:
General Solution of f(D)y=0
Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators:
General Solution of f(D)y=Q(x) :

i) P.I. of f(D)y = Q(x) where Q(x)= be^{ax}
ii) P.I. of f(D)y = Q(x) where Q(x) is $b sinax$ or $bcosax$.

UNIT – IV (12 Hours), Higher order linear differential equations-II :
Solution of the non-homogeneous linear differential equations with constant coefficients:

P.I. of f(D)y = Q when Q= bx^{k}
P.I. of f(D)y = Q when Q= $e^{ax}v(x)$
P.I. of f(D)y = Q when Q= $xv(x)$
P.I. of f(D)y = Q when Q= $x^{m}v(x)$

UNIT –V (12 Hours), Higher order linear differential equations-III :
Method of variation of parameters; Linear differential Equations with non-constant coefficients: The Cauchy-Euler Equation.

Reference Books :
1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol 1 by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.
3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
4. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha universities press.

Suggested Activities:
Seminar/ Quiz/ Assignments/ Project on Application of Differential Equations in Real life.

M. Madhavi
26/2/18

Course Title :Solid Geometry   **Course Code: MAT2301**

Total No. of Teaching Hrs.: 60hrs.   **Lecture: 6hrs. Credits: 5**

UNIT – I : The Plane(12hrs)

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 : The Line (12hrs)

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 : Sphere (12hrs)

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 : Sphere &Cones (12hrs)

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; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators;

UNIT – V : Cones & Cylinders (12hrs)

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; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle.

Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.

2. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.

3. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley Eastern Ltd., 1999

.**4.** Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam G.R.Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi.

M.Madhavi
26/2/19

Course Title : Abstract Algebra   **Course Code:** MAT3301

Total No. of Teaching Hrs.: 60hrs.   **Lecture:** 6hrs.   **Credits:** 5

UNIT – 1 (10hrs) GROUPS : -
Binary Operation; Algebraic structure; semi group; monoid; Group definition and elementary properties; Finite and Infinite groups with examples; order of a group. Composition tables with examples.

UNIT – 2 (14hrs) SUBGROUPS : -
Complex Definition; Multiplication of two complexes, Inverse of a complex-Subgroup definition with examples; criterion for a complex to be a subgroup.
Criterion for the product of two subgroups to be a subgroup; union and Intersection of subgroups.

Co-sets and Lagrange's Theorem :-
Co-sets Definition; properties of Cosets; Index of a subgroups of a finite groups:Lagrange's Theorem.

UNIT –3 (12hrs) NORMAL SUBGROUPS : -
Definition of normal subgroup; proper and improper normal subgroup; Hamilton group; criterion for a subgroup to be a normal subgroup; intersection of two normal subgroups; Sub group of index 2 is a normal sub group; simple group; quotient group; criteria for the existence of a quotient group.

UNIT – 4 (10hrs) HOMOMORPHISM : -
Definition of homomorphism; Image of homomorphism;elementary properties of homomorphism; definition of Isomorphism , automorphism and their elementary properties; kernel of a homomorphism; fundamental theorem on Homomorphism and applications.

UNIT – 5 (14hrs) PERMUTATIONS AND CYCLIC GROUPS : -
Definition of permutation; permutation multiplication ; Inverse of a permutation ;cyclic permutations ; transposition; even and odd permutations ; Cayley's theorem.

Cyclic Groups :-
Definition of cyclic group and its elementary properties; classification of cyclic groups.

Reference Books :
1. Abstract Algebra, by J.B. Fraleigh, Published by Narosa Publishing house.
2. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, Published by S.Chand & Company, New Delhi.
3. Modern Algebra by M.L. Khanna.

Suggested Activities:
Seminar/ Quiz/ Assignments/ Project on Group theory and its applications in Graphics and Medical image Analysis.

M. Madhavi
26/2/19

A.S.D. GOVT.DEGREE COLLEGE FOR WOMEN(A), KAKINADA.
DEPARTMENT OF MATHEMATICS
B.Sc. FIRST YEAR MATHEMATICS SEMESTER –IV SYLLABUS

Course Title : Real Analysis
Course Code: MAT4301
Total No. of Teaching Hrs.: 60hrs.
Lecture: 6hrs. **Credits:** 5

UNIT – I (12hrs) REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme 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 (12hrs) INFINITIE SERIES :

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

i)P-test
ii)Cauchy's nth root test or Root Test.
iii) D'-Alemberts' Test or Ratio Test.
Alternating Series:
 Leibnitz Test.
Absolute convergence, conditional convergence and semi convergence.

UNIT – III (12hrs)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 (12hrs) DIFFERENTIATION AND MEAN VALUE THEORMS :

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

UNIT – V (12hrs) RIEMANN INTEGRATION :

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

Reference Books :
1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi.

Suggested Activities:
 Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications.

M. Madhavi
26/2/19

Course Title : Ring Theory and Vector Calculus

Course Code: MAT5301

Total No. of Teaching Hrs.: 60hrs.

Lecture: 5hrs. Credits: 5

UNIT – 1(12hrs) RINGS-I : -

Definition of Ring and basic properties, Boolean Rings, zero divisors and cancellation laws of Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring :The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals.

UNIT – 2 (12hrs) RINGS-II : -

Definition of Homomorphism ; homomorphic Image ; Elementary Properties of Homomorphism ;Kernel of a Homomorphism ; Fundamental theorem of Homomorhphism .Maximal Ideals ,Prime Ideals.

UNIT –3 (12hrs) VECTOR DIFFERENTIATION : -

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

UNIT – 4 (12hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral and Volume integral with examples.

UNIT – 5 (12hrs) VECTOR INTEGRATION APPLICATIONS : -

Theorems of Gauss , Stokes and Green's theorem in plane, applications of these theorems.

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications.
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications.

M. Madhavi
26/2/18

A.S.D. GOVT.DEGREE COLLEGE FOR WOMEN(A), KAKINADA.
DEPARTMENT OF MATHEMATICS
B.Sc. FIRST YEAR MATHEMATICS SEMESTER –V SYLLABUS

Course Title :Linear Algebra   **Course Code:** MAT5302

Total No. of Teaching Hrs.: 60hrs.   **Lecture:** 5hrs. **Credits:** 5

UNIT – I (12hrs) 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 (12hrs) 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 (12hrs)Linear Transformations :
Linear transformations, linear operators, Properties of L.T, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations; Rank – Nullity Theorem.

UNIT –IV (12hrs)Matrix :
Matrices, Elementary Properties of Matrices, Inverse of a Matrix, Rank of a Matrix Characteristic roots and Vectors of a square Matrix, Cayley – Hamilton Theorem, Linear system of equations

UNIT –V (12hrs) Inner product space :
Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz's inequality, Triangular Inequality, Parallelogram law, Orthogonal vectors , Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Reference Books :
1. Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut-250002.
2. Matrices by Shanti Narayana, published by S.Chand Publications.
3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition), New Delhi.
4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007.

Suggested Activities:
Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer Sciences"

M.Madhavi
26/2/19

Course Title : Numerical Analysis	**Course Code:** MAT6301
Total No. of Teaching Hrs.: 60hrs.	**Lecture:** 5hrs. **Credits:** 5

UNIT- I(10hrs) Errors in Numerical computations :

Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II(12hrs) Solution of Algebraic and Transcendental Equations:

The bisection method, The method of false position, The iteration method ,Newton - Raphson method, Generalized Newton- Raphson method. Muller's Method.

UNIT – III(12hrs) Interpolation - I

Interpolation : Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial.

UNIT – IV(12hrs) Interpolation - II

Newton's formulae for interpolation. Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

UNIT – V : (14hrs) Interpolation - III

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation by Lagrange's interpolation formula.

Reference Books :
1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company,Pvt.Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

M.Madhavi
26/2/19

Course Title : Advanced Numerical Analysis

Course Code: 18301

Total No. of Teaching Hrs.: 60hrs.

Lecture: 5hrs. **Credits:** 5

Unit – I (10 Hours)
Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II : (12 hours)
Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III : (12 hours)
Numerical Integration: General quadrature formula on errors, Trapizoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, and Weddle's rules, Euler – Maclaurin's Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (14 hours)
Solutions of simultaneous Linear Systems of Equations: Solution of linear systems by Direct methods: Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method , Method of factorization, Solution of Tri diagonal Systems.
Iterative methods: Jacobi's method, Gauss-siedel method.

UNIT – V (12 Hours)
Numerical solution of ordinary differential equations: Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

Reference Books :
1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt.Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

M.Madhavi
26/2/19

Course Title : Special Functions   **Course Code: 18302**

Total No. of Teaching Hrs.: 60hrs.   **Lecture: 6hrs. Credits: 5**

Unit – I :(HERMITE POLYNOMIAL)

Hermite Differential Equations, Solutions of Hermitic Equation, Hermite's polynomials, Generating function, Other forms of Hermite Polynomial, first few Hermite Polynomials, Orthogonal properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials. CHAPTER: 6.1 to 6.8

Unit – II :(LAGUERRE POLYNOMIALS-I):

Laguerre's differential equation, Solution of Laguerre's equation, Laguerre polynomials, Generating function, other forms for Laguerre Polynomials, first few Laguerre Polynomials, Orthogonal property of the Laguerre Polynomials, Recurrence formula for Laguerre Polynomials, Associated Laguerre Equation. CHAPTER: 7.1 to 7.9

Unit – III:(LEGENDER'S EQUATION)

Definition, Solution of Legender's Equation, Definition of $P_n(x), Q_n(x)$, General solution of Legender's Equation (derivations not required), Generating function, Orthogonal properties of Legender's Equation, Recurrence formulae, Rodrigues formula. CHAPTER: 2.1 to,2.8,2.12,

Unit – IV:(BESSEL'S EQUATION):

Definition, Solution of Bessel's General Differential Equations, General solution of Bessel's Equation, Integration of Bessel's equation in series for n=0, Definition of $J_n(x)$, Recurrence formulae for $J_n(x)$, Generating function for $J_n(x)$. CHAPTER: 5.1 to 5.7

Unit – V:(BETA & GAMMA FUNCTIONS):

Euler's Integrals-Beta and Gamma Functions, Elementary properties of Gamma Functions, Transformation of Gamma Functions, Another form of Beta Function, Relation between Beta and Gamma Functions, Other Transformation. CHAPTER: 2.9to 2.15

Prescribed text book: Special Functions by J.N.Sharma and Dr.R.K.Gupta.

For all Degree Programmes. w.e.f. 2015-16 Semester – IV Foundation Course - 8

Course Title : Analytical Skills   **Course Code:**

Total No. of Teaching Hrs.: 30hrs.   **Lecture:** 2hrs. **Credits:** 2

UNIT – 1 Data Analysis:-The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a passage is to be analyzed and the questions pertaining to the data are to be answered.

UNIT – 2 Sequence and Series:- Analogies of numbers and alphabets completion of blank spaces following the pattern in A:b::C: d relationship odd thing out; Missing number in a sequence or a series.

UNIT - 3 Arithmetic ability:-Algebraic operations BODMAS, Fractions, Divisibility rules, LCM&GCD (HCF). Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

UNIT - 4 Quantitative aptitude:- Averages, Ration and proportion, Problems on ages, Time-distance – speed.

UNIT – 5 Business computations:- Percentages, Profit &loss, Partnership, simple compound interest.

Reference Books: 1. Quantitative Aptitude for Competitive Examination by R S Agrawal, S.Chand publications.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers
4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.
5. Old question Paper of the exams conducted by (Wipro, TCS, Infosys, Etc) at their recruitment process, source-Internet.

M-Madhavi
26/2/19

Course Title : Numerical Analysis

Total No. of Teaching Hrs.: 60hrs.

Course Code:MAT6301

Lecture: 5hrs. Credits: 5

UNIT- I(10hrs) Errors in Numerical computations :

Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II(12hrs) Solution of Algebraic and Transcendental Equations:

The bisection method, The method of false position, The iteration method ,Newton - Raphson method, Generalized Newton- Raphson method. Muller's Method.

UNIT – III(12hrs) Interpolation - I

Interpolation : Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial.

UNIT – IV(12hrs) Interpolation - II

Newton's formulae for interpolation. Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

UNIT – V : (14hrs) Interpolation - III

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation by Lagrange's interpolation formula.

Reference Books :
1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company,Pvt.Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

M .Madhavi

26/2/19

Course Title : Advanced Numerical Analysis

Total No. of Teaching Hrs.: 60hrs.

Course Code: 18301

Lecture: 5hrs. **Credits:** 5

Unit – I (10 Hours)
Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II : (12 hours)
Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III : (12 hours)
Numerical Integration: General quadrature formula on errors, Trapizoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, and Weddle's rules, Euler – Maclaurin's Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (14 hours)
Solutions of simultaneous Linear Systems of Equations: Solution of linear systems by Direct methods: Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method , Method of factorization, Solution of Tri diagonal Systems.
Iterative methods: Jacobi's method, Gauss-siedel method.

UNIT – V (12 Hours)
Numerical solution of ordinary differential equations: Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

Reference Books :
1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt.Ltd., New Delhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

M.Madhavi
24/2/18

B.Sc. FIRST YEAR MATHEMATICS SEMESTER –VI SYLLABUS

Course Title : Special Functions

Total No. of Teaching Hrs.: 60hrs.

Course Code: 18302

Lecture: 6hrs. **Credits:** 5

Unit – I :(HERMITE POLYNOMIAL)

Hermite Differential Equations, Solutions of Hermitic Equation, Hermite's polynomials, Generating function, Other forms of Hermite Polynomial, first few Hermite Polynomials, Orthogonal properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials. CHAPTER: 6.1 to 6.8

Unit – II :(LAGUERRE POLYNOMIALS-I):

Laguerre's differential equation, Solution of Laguerre's equation, Laguerre polynomials, Generating function, other forms for Laguerre Polynomials, first few Laguerre Polynomials, Orthogonal property of the Laguerre Polynomials, Recurrence formula for Laguerre Polynomials, Associated Laguerre Equation. CHAPTER: 7.1 to 7.9

Unit – III:(LEGENDER'S EQUATION)

Definition, Solution of Legender's Equation, Definition of $P_n(x), Q_n(x)$, General solution of Legender's Equation (derivations not required), Generating function, Orthogonal properties of Legender's Equation, Recurrence formulae, Rodrigues formula. CHAPTER: 2.1 to,2.8,2.12,

Unit – IV:(BESSEL'S EQUATION):

Definition, Solution of Bessel's General Differential Equations, General solution of Bessel's Equation, Integration of Bessel's equation in series for n=0, Definition of $J_n(x)$, Recurrence formulae for $J_n(x)$, Generating function for $J_n(x)$. CHAPTER: 5.1 to 5.7

Unit – V:(BETA & GAMMA FUNCTIONS):

Euler's Integrals-Beta and Gamma Functions, Elementary properties of Gamma Functions, Transformation of Gamma Functions, Another form of Beta Function, Relation between Beta and Gamma Functions, Other Transformation. CHAPTER: 2.9to 2.15

Prescribed text book: Special Functions by J.N.Sharma and Dr.R.K.Gupta.

M.Madhavi
26/2/19

A.S.D. GOVT.DEGREE COLLEGE FOR WOMEN(A), KAKINADA.

DEPARTMENT OF MATHEMATICS

B.Sc. FIRST YEAR MATHEMATICS SEMESTER –VI (Elective)SYLLABUS

Course Title : Laplace Transforms

Course Code: MAT6301

Total No. of Teaching Hrs.: 60hrs.

Lecture: 5hrs. **Credits:** 5

UNIT – 1 (12 hrs) Laplace Transform I : -
Definition of Integral Transform ;Laplace Transform; Linear Property,
Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A.

UNIT – 2 (12 hrs) Laplace Transform II : -
First Shifting Theorem, Second Shifting Theorem, Change of Scale Property,
Laplace Transform of the derivative of f(t), Initial Value theorem and Final Value theorem.

UNIT – 3 (12 hrs) Laplace Transform III : -
Laplace Transform of Integrals – Multiplication by t, Multiplication by t^n– Division by t. Laplace transform of Bessel Function, Laplace Transform of Error Function, Laplace Transform of Sine and cosine integrals.

UNIT –4 (12 hrs) Inverse Laplace Transform I : -
Definition of Inverse Laplace Transform, Linear Property, First Shifting
Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions:Examples.

UNIT –5 (12 hrs) Inverse Laplace Transform II : -
Inverse Laplace transforms of Derivatives,Inverse Laplace Transforms of Integrals, Multiplication by Powers of 'P', Division by powers of 'P', Convolution Definition,
Convolution Theorem (proof) and Applications – Heaviside's Expansion theorem and its Applications.

Reference Books :-
1. Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi.
3. Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
4. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.

26/2/19

Course Title : Number Theory   **Course Code: MAT6301**

Total No. of Teaching Hrs.: 60hrs.   **Lecture: 5hrs. Credits: 5**

UNIT-I (12 hours)
Divisibility;Greatest Common Divisor ,Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT-II (12 hours)
Congruences ,Special Divisibility Tests ,Chinese Remainder Theorem, Fermat's Little Theorem, Wilson's Theorem , Residue Classes and Reduced Residue Classes, Solutions of Congruences.

UNIT-III (12 hours)
Number Theory from an Algebraic Viewpoint – Multiplicative Groups, Rings and Fields

UNIT-IV (12 hours)
Quadratic Residues - Quadratic Reciprocity – The Jacobi Symbol

UNIT-V (12 hours)
Greatest Integer Function – Arithmetic Functions – The Moebius Inversion Formula

Reference Books:
1. "Introduction to the Theory of Numbers" by Niven, Zuckerman & Montgomery (John Wiley & Sons)
2. "Elementary Number Theory" by David M. Burton.
3. Elementary Number Theory, by David, M. Burton published by 2nd Edition (UBS Publishers).
4. Introduction to Theory of Numbers, by Davenport H., Higher Arithmetic published by 5th Edition (John Wiley & Sons) Niven,Zuckerman & Montgomery.(Camb, Univ, Press)
5. Number Theory by Hardy & Wright published by Oxford Univ, Press.
6. Elements of the Theory of Numbers by Dence, J. B & Dence T.P published by Academic Press.

A.S.D. GOVT.DEGREE COLLEGE FOR WOMEN(A), KAKINADA.

DEPARTMENT OF MATHEMATICS

B.Sc. FIRST YEAR MATHEMATICS SEMESTER –VI SYLLABUS

Course Title : Graph Theory **Course Code:** MAT6301

Total No. of Teaching Hrs.: 60hrs. **Lecture:** 5hrs. **Credits:** 5

UNIT – I (12 hrs) Graphs and Sub Graphs :
Graphs , Simple graph, graph isomorphism, the incidence and adjacency matrices, sub graphs, vertex degree, Hand shaking theorem, paths and connection, cycles.

UNIT – II (12 hrs)
Applications, the shortest path problem, Sperner's lemma.

Trees :
Trees, cut edges and Bonds, cut vertices, Cayley's formula.

UNIT – III (12 hrs) :
Applications of Trees - the connector problem.

Connectivity
Connectivity, Blocks and Applications, construction of reliable communication Networks,

UNIT – IV (12 hrs):

Euler tours and Hamilton cycles
Euler tours, Euler Trail, Hamilton path, Hamilton cycles , dodecahedron graph, Petersen graph, hamiltonian graph, closure of a graph.

UNIT – V (12 hrs)
Applications of Eulerian graphs, the Chinese postman problem, Fleury's algorithm - the travelling salesman problem.

Reference Books :
1. Graph theory with Applications by J.A. Bondy and U.S.R. Murthy published by Mac. Millan Press
2. Introduction to Graph theory by S. Arumugham and S. Ramachandran, published by scitech Publications, Chennai-17.
3. A Text Book of Discrete Mathamatics by Dr. Swapan Kumar Sankar, published by S.Chand & Co.Publishers, New Delhi.
4. Graph theory and combinations by H.S. Govinda Rao published by Galgotia Publications.

26/2/19

Course Title : Integral Transforms

Total No. of Teaching Hrs.: 60hrs.

Course Code: 18301

Lecture: 5hrs.   **Credits:** 5

UNIT – 1 (12 hrs) Application of Laplace Transform to solutions of Differential Equations : -
Solutions of ordinary Differential Equations.
Solutions of Differential Equations with constant coefficients, Differential Equations with Variable coefficients.

UNIT – 2 (12 hrs) Application of Laplace Transform : -
Solution of simultaneous ordinary Differential Equations, of partial Differential Equations.

UNIT – 3 (12 hrs) Application of Laplace Transforms to Integral Equations : -
Definitions : Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro - Differential Equations, Application of L.T. to Integral Equations.
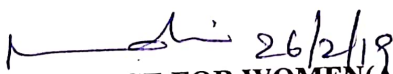
UNIT –4 (12 hrs) Fourier Transforms-I : -
Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform –
Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT – 5 (12 hrs) Fourier Transform-II : -
Convolution Definition – Convolution Theorem for Fourier transform – parseval's
Identity – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Finite Fourier Transforms: -
Finite Fourier Sine Transform – Finite Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

Reference Books :-
1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Lapalce and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.

26/2/18

Course Title : Principles of Mechanics   **Course Code:** 18301

Total No. of Teaching Hrs.: 60hrs.   **Lecture:** 5hrs.   **Credits:** 5

Unit – I : (10 hours)
D'Alembert's Principle and Lagrange's Equations : some definitions – Lagrange's equations for a Holonomic system – Lagrange's Equations of motion for conservative, non-holonomic system.

Unit – II: (10 hours)
Variational Principle and Lagrange's Equations: Variational Principle – Hamilton's Principle – Derivation of Hamilton's Principle from Lagrange's Equations – Derivation of Lagrange's Equations from Hamilton's Principle – Extension of Hamilton's Principle – Hamilton's Principle for Non-conservative, Non-holonomic system – Generalised Force in Dynamic System – Hamilton's Principle for Conservative, Non-holonomic system – Lagrange's Equations for Nonconservative,
Holonomic system - Cyclic or Ignorable Coordinates.

Unit –III: (15 hours)
Conservation Theorem, Conservation of Linear Momentum in Lagrangian Formulation – Conservation of angular Momentum – conservation of Energy in Lagrangian formulation.

Unit – IV: (15 hours)
Hamilton's Equations of Motion: Derivation of Hamilton's Equations of motion – Routh's procedure – equations of motion – Derivation of Hamilton's equations from Hamilton's Principle – Principle of Least Action – Distinction between Hamilton's Principle and Principle of Least Action.

Unit – V: (10 hours)
Canonical Transformation: Canonical coordinates and canonical transformations – The necessary and sufficient condition for a transformation to be canonical – examples of canonical transformations – properties of canonical transformation – Lagrange's bracket is canonical invariant – poisson's bracket is canonical invariant - poisson's bracket is invariant under canonical transformation – Hamilton's Equations of motion in poisson's bracket – Jacobi's identity for poisson's brackets.

Reference Text Books :
1. Classical Mechanics by C.R.Mondal Published by Prentice Hall of India, New Delhi.
2. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.
3. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.
4. Fluid Mechanics by T. Allen and I.L. Ditsworth Published by (McGraw Hill, 1972)
5. Fundamentals of Mechanics of fluids by I.G. Currie Published by (CRC, 2002)
6. Fluid Mechanics : An Introduction to the theory, by Chia-shun Yeh Published by (McGraw Hill, 1974)
7. Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J. Pritchard Published by (John Wiley and Sons Pvt. Ltd., 2003)

26/2/19

Course Title : Fluid Mechanics

Total No. of Teaching Hrs.: 60hrs.

Course Code: 18302

Lecture: 5hrs. **Credits:** 5

Unit – I : (10 hours)
Kinematics of Fluids in Motion
Real fluids and Ideal fluids – Velocity of a Fluid at a point – Streamlines and pthlines – steady and Unsteady flows – the velocity potential – The Vorticity vector – Local and Particle Rates of Change – The equation of Continuity – Acceleration of a fluid – Conditions at a rigid boundary – General Analysis of fluid motion.

Unit – II : (10 hours)
Equations of motion of a fluid- Pressure at a point in fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equations of motion – Bernoulli's equation – Worked examples.

Unit – III : (10 hours)
Discussion of the case of steady motion under conservative body forces - Some flows involving axial symmetry – Some special two-dimensional flows – Impulsive motion – Some further aspects of vortex motion.

Unit – IV : (15 hours)
Some Two – dimensional Flows, Meaning of two-dimensional flow – Use of Cylindrical polar coordinates – The stream function – The complex potential for two-dimensional, Irrotational, Incompressible flow – Uniform Stream – The Milne-Thomson Circle theorem – the theorem of Blasius.

Unit – V : (15 hours)
Viscous flow,Stress components in a real fluid – Relations between Cartesian components of stress – Translational motion of fluid element – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relations between stress and rate of strain – the coefficient of viscosity and laminar flow - The Navier-Stokes equations of motion of a viscous fluid.

Reference Text Books :
1. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.
2. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.
3. Fluid Mechanics by T. Allen and I.L. Ditsworth published by (McGraw Hill, 1972)
4. Fundamentals of Mechanics of fluids by I.G. Currie published by (CRC, 2002)
5. Fluid Mechanics, An Introduction to the theory by Chia-shun Yeh published by (McGraw Hill, 1974)
6. Fluids Mechanics by F.M White published by (McGraw Hill, 2003)
7. Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J. Pritchard published by (John Wiley and Sons Pvt. Ltd., 2003)

26/2/19

Course Title : Applied Graph Theory   **Course Code:** 18301

Total No. of Teaching Hrs.: 60hrs.   **Lecture:** 5hrs.   **Credits:** 5

UNIT – I (12 hrs) :

Matchings

Matchings – Alternating Path, Augmenting Path - Matchings and coverings in Bipartite graphs, Marriage Theorem, Minimum Coverings.

UNIT –II (12 hrs) :

Perfect matchings, Tutte's Theorem, Applications, The personal Assignment problem -The optimal Assignment problem, Kuhn-Munkres Theorem.

UNIT –III (12 hrs) :

Edge Colorings

Edge Chromatic Number, Edge Coloring in Bipartite Graphs - Vizing's theorem.

UNIT –IV (12 hrs) :

Applications of Matchings, The timetabling problem.

Independent sets and Cliques

Independent sets, Covering number , Edge Independence Number, Edge Covering Number - Ramsey's theorem.

UNIT –V (12 hrs) :

Determination of Ramsey's Numbers – Erdos Theorem, Turan's theorem and Applications, Sehur's theorem. A Geometry problem.

Reference Books :-

1. Graph theory with Applications by J.A. Bondy and U.S.R. Murthy, published by Mac. Millan Press.
2. Introduction to graph theory by S. Arumugham and S. Ramachandran published by SciTech publications, Chennai-17.
3. A text book of Discrete Mathematics by Dr. Swapan Kumar Sarkar, published by S. Chand Publishers.
4. Graph theory and combinations by H.S. Govinda Rao, published by Galgotia Publications.

26/2/19