

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2013 – 14.

Department: Mathematics Paper: Differential equations&Abstract Algebra
Class: I BSc Semester: I

Linear differential equations,differential equations reducible to linear form,Exact differential equations
Integrating factor ,change of variables, total differential equations, Methods of solving integrable total differential equations
Simultaneous differential equations, methods of finding general solution of $F(x,y,p)=0$
Orthogonal trajectories, groups-elementary properties, binary operations,
Groups. Finite groups and group tables, subgroups
Cosets, Lagrange's theorem
Normal subgroups & factor groups
Homomorphisms-definition and elementary properties, Isomorphisms, fundamental theorem of homomorphism
Automorphism, permutation groups,cayley's theorem
Groups of permutations,cycles, Alternating group A_n
Cyclic groups- definition and examples, classification of cyclic groups
Generators and subgroups of cyclic groups

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)

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Bhimavaram, W.G.DIST. A.P.

Academic Year: 2014 – 15

Department: Mathematics

Paper: Differential equations&Abstract Algebra

Class: I BSc

Semester: I

Linear differential equations,differential equations reducible to linear form,Exact differential equations
Integrating factor ,change of variables, total differential equations, Method s of solving integrable total differential equations
Simultaneous differential equations, methods of finding general solution of $F(x,y,p)=0$
Orthogonal trajectories, groups-elementary properties, binary operations,
Groups. Finite groups and group tables, subgroups
Cosets, Lagrange's theorem
Normal subgroups & factor groups
Homomorphisms-definition and elementary properties, Isomorphisms, fundamental theorem of homomorphism
Automorphism, permutation groups,cayley's theorem
Groups of permutations,cycles, Alternating group A_n
Cyclic groups- definition and examples, classification of cyclic groups
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Bhimavaram, W.G.DIST. A.P.

Academic Year: 2015 – 16.

Department: Mathematics

Paper: Differential Equations, IA

Class: I BSC

Semester: I

Linear differential equations, Differential equations reducible to linear form
Exact differential equations, Integrating factors, change of variables
Simultaneous differential equations, orthogonal trajectories
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
Solution of homogeneous linear differential equations of order n with constant coefficients
Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators
Method of variation of parameters, linear differential equations with non-constant coefficients
The Cauchy-euler equation, system of linear differential equations
Formation of partial differential equations, equations of first order
Lagrange's linear equations, Charpit's method
Standard types of first order non linear partial differential equations

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)

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Bhimavaram, W.G.DIST. A.P.

Academic Year: 2016 – 17.

Department: Mathematics

Paper: Differential Equations

Class: I BSc

Semester: 1

Linear differential equations; Differential equations reducible to linear form
Exact differential equations; Integrating factors; Change of variables
Orthogonal trajectories, 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.
Solution of homogeneous linear differential equations of order n with constant coefficients. Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.
General Solution of $f(D)y=0$, General solution of $f(D)y=Q$ when Q is a function of x, $1/f(D)$ is expressed as partial fractions
Particular integral of $f(D)y=Q$ when $Q=be^{ax}$, particular integral of $f(D)y=Q$ when $Q=bsinax, bcosax$
Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators, particular integral of $f(D)y=Q$ when $Q=bx^k$.
Particular integral of $f(D)y=Q$, when $Q=e^{ax}V$, where V is a function of x, particular integral of $f(D)y=Q$, when $Q=xV$, where V is a function of x.
Particular integral of $f(D)y=Q$, when $Q=x^nV$, where V is a function of x. Method of variation of Parameters.
Linear Differential equations with non-constant coefficients, The Cauchy - Euler equations
Method of undetermined coefficients.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2017 – 18.

Department: Mathematics Paper: Differential Equations, 1A
 Class: I BSc Semester: I

Linear differential equations; Differential equations reducible to linear form
Exact differential equations; Integrating factors; Change of variables
Orthogonal trajectories, 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.
Solution of homogeneous linear differential equations of order n with constant coefficients. Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.
General Solution of $f(D)y=0$, General solution of $f(D)y=Q$ when Q is a function of x , $1/f(D)$ is expressed as partial fractions
Particular integral of $f(D)y=Q$ when $Q=be^{ax}$, particular integral of $f(D)y=Q$ when $Q=b\sin ax, b\cos ax$
Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators, particular integral of $f(D)y=Q$ when $Q=bx^k$.
Particular integral of $f(D)y=Q$, when $Q=e^{ax}V$, where V is a function of x , particular integral of $f(D)y=Q$, when $Q=xV$, where V is a function of x .
Particular integral of $f(D)y=Q$, when $Q=x^nV$, where V is a function of x . Method of variation of Parameters.
Linear Differential equations with non-constant coefficients
The Cauchy-Euler Equations
Method of undetermined coefficients

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Academic Year: 2018 – 19

Department: Mathematics Paper: Differential Equations, IA
 Class: I BSc Semester: I

Linear differential equations; Differential equations reducible to linear form
Exact differential equations; Integrating factors; Change of variables
Orthogonal trajectories, 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.
Solution of homogeneous linear differential equations of order n with constant coefficients. Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.
General Solution of $f(D)y=0$, General solution of $f(D)y=Q$ when Q is a function of x, $1/f(D)$ is expressed as partial fractions
Particular integral of $f(D)y=Q$ when $Q=be^{ax}$, particular integral of $f(D)y=Q$ when $Q=b\sin ax, b\cos ax$
Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators, particular integral of $f(D)y=Q$ when $Q=bx^k$.
Particular integral of $f(D)y=Q$, when $Q=e^{ax}V$, where V is a function of x, particular integral of $f(D)y=Q$, when $Q=xV$, where V is a function of x.
Particular integral of $f(D)y=Q$, when $Q=x^nV$, where V is a function of x. Method of variation of Parameters.
Linear Differential equations with non-constant coefficients, The Cauchy - Euler equations
Method of undetermined coefficients.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2013 – 14.

Department: Mathematics Paper: Differential equations&Real Analysis, 1B
 Class: I BSc Semester: II

Linear differential Equations with constant coefficients, Homogeneous linear differential equations with constant coefficients
Solution of homogeneous linear differential equations of order n with constant coefficients
Solution of non homogeneous linear differential equations with constant coefficients by means of polynomial operators
Linear differential equations with variable coefficients, method of variation of parameters
Linear differential equations with non-constant coefficients, the Cauchy Euler equation, method of undetermined coefficients
System of linear differential equations: system of first order differential equations, solution of a system of linear equations with constant coefficients,an equivalent triangular system,degenerate case
The Real numbers: the set of natural numbers, integers, rational numbers and real numbers,the set of real numbers, IR has complete ordered pair intervals, bounds&orders-completeness of the set of real numbers
Some important properties of real numbers, the dense property of the set of real numbers, the modulus of real numbers
Limit point of a set, existence of limit point
Sequence, bounded and unbounded sequence, limit point of a sequence,convergent sequences,limit of a sequence,algebra of convergent sequences,bounded non convergent sequence,Important theorems on limits,Cauchy sequence
Convergency of a sequence, monotonic sequence and their convergency,subsequences,Infinite series with positive terms,Infinite series of its convergency and sum
A necessary condition for the convergency of an infinite series, cauchy's general principle of convergence
General test for convergency of positive term series, two important standard series,
Comparison test for the convergency of positive term series, comparison test of the first type
Practical comparison test of the first type and comparison test of the second type
Practical comparison test of the second type, D'Alembert's ratio test, Cauchy's n^{th} root test

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Academic Year: 2014 – 15

Department: Mathematics Paper: Differential equations & Real Analysis, 1B
 Class: I BSc Semester: II

Linear differential Equations with constant coefficients, Homogeneous linear differential equations with constant coefficients
Solution of homogeneous linear differential equations of order n with constant coefficients
Solution of non homogeneous linear differential equations with constant coefficients by means of polynomial operators
Linear differential equations with variable coefficients, method of variation of parameters
Linear differential equations with non-constant coefficients, the Cauchy-Euler equation, method of undetermined coefficients
System of linear differential equations: system of first order differential equations, solution of a system of linear equations with constant coefficients, an equivalent triangular system, degenerate case
The Real numbers: the set of natural numbers, integers, rational numbers and real numbers, the set of real numbers, \mathbb{R} has complete ordered pair intervals, bounds & orders-completeness of the set of real numbers
Some important properties of real numbers, the dense property of the set of real numbers, the modulus of real numbers
Limit point of a set, existence of limit point
Sequence, bounded and unbounded sequence, limit point of a sequence, convergent sequences, limit of a sequence, algebra of convergent sequences, bounded non convergent sequence, Important theorems on limits, Cauchy sequence
Convergency of a sequence, monotonic sequence and their convergency, subsequences, Infinite series with positive terms, Infinite series of its convergency and sum
A necessary condition for the convergency of an infinite series, Cauchy's general principle of convergence
General test for convergency of positive term series, two important standard series,
Comparison test for the convergency of positive term series, comparison test of the first type
Practical comparison test of the first type and comparison test of the second type
Practical comparison test of the second type, D'Alembert's ratio test, Cauchy n^{th} root test

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 Academic Year: 2015 – 16

Department: Mathematics
 BSc

Semester II

Paper: Solid Geometry, 1B

Class: I

Co-ordinates of a point in \mathbb{R}^3 , Distance between two points, section formula, angle between two lines
Equation of a plane in terms of it's intercepts on the axis, equation of the plane through the given points Length of perpendicular from a given point to a given plane, bisector of angle between planes
Combined equation of two planes, orthogonal projection on a plane, 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 equation of the short distance between two straight lines
Length of the perpendicular from a given point to a given line, definition and equation of the sphere
Equation of the sphere through four point, Plane section of a sphere, Intersection of two spheres, equation of a circle, sphere through a given circle,
intersection of a sphere and a line, tangent plane, plane of contact, polar plane, Pole of a plane, conjugate points, conjugate planes
angle of intersection of two spheres
conditions for two spheres to be orthogonal, power of a point, radical plane, Co-axial system of spheres, simplified form of the equation of two spheres, definition of a cone
Equation of cones with vertex at origin are homogeneous, condition that the general equation of the second degree should represent a cone
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, tangent plane at a point, condition that a plane may touch the 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 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

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 Academic Year: 2016 – 17

Department: Mathematics
 BSc Semester: II

Paper: Solid Geometry, 1B

Class: I

Co-ordinates of a point in, Distance between two points, section formula, angle between two lines
Equation of a plane in terms of it's intercepts on the axis, equation of the plane through the given points Length of perpendicular from a given point to a given plane, bisector of angle between planes
Combined equation of two planes, orthogonal projection on a plane, 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 equation of the short distance between two straight lines
Length of the perpendicular from a givenj point to a given line,definition and equation of the sphere
Equation of the sphere through four point,Plane section of a sphere, Intersection of two spheres, equation of a circle, sphere through a given circle,
intersection of a sphere and a line, tangent plane, plane of contact,polar plane, Pole of a plane, conjugate points, conjugate planes
angle of intersection of two spheres
conditions for two spheres to be orthogonal, power of a point, radical plane, Co-axial system of spheres, simplified form of the equation of two spheres, definition of a cone
Equationof cones with vertex at origin are homogeneous, condition that the general equation of the second degree should represent a cone
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 3 mutually perpendicular generators, intersection of a line and a quadric cone
Tangent lines, tangent plane at a point, condition that a plane may touch the 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 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

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 Academic Year: 2017 – 18.

Department: Mathematics
 BSc Semester: II

Paper: Solid Geometry, 1B

Class: I

Co-ordinates of a point in \mathbb{R}^3 , Distance between two points, section formula, angle between two lines
Equation of a plane in terms of it's intercepts on the axis, equation of the plane through the given points
Length of perpendicular from a given point to a given plane, bisector of angle between planes
Combined equation of two planes, orthogonal projection on a plane
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 equation of the short distance between two straight lines
Length of the perpendicular from a given point to a given line, definition and equation of the sphere
Equation of the sphere through four point, Plane section of a sphere
Intersection of two spheres, equation of a circle, sphere through a given circle, intersection of a sphere and a line, tangent plane, plane of contact, polar plane
Pole of a plane, conjugate points, conjugate planes, angle of intersection of two spheres, conditions for two spheres to be orthogonal, power of a point, radical plane
Co-axial system of spheres, simplified form of the equation of two spheres, definition of a cone, vertex, guiding curve, generators, equation of the cone with a given vertex and guiding curve
Equation of cones with vertex at origin are homogeneous, condition that the general equation of the second degree should represent a cone
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 3 mutually perpendicular generators, intersection of a line and a quadric cone
Tangent lines, tangent plane at a point, condition that a plane may touch the cone, reciprocal cones, intersection of two cones with a common vertex

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 Academic Year: 2018 – 19.

Department: Mathematics
 BSc Semester:II

Paper: Solid Geometry, 1B

Class: I

Co-ordinates of a point in \mathbb{R}^3 , Distance between two points, section formula, angle between two lines
Equation of a plane in terms of it's intercepts on the axis, equation of the plane through the given points
Length of perpendicular from a given point to a given plane, bisector of angle between planes
Combined equation of two planes, orthogonal projection on a plane
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 equation of the short distance between two straight lines
Length of the perpendicular from a given point to a given line, definition and equation of the sphere
Equation of the sphere through four point, Plane section of a sphere
Intersection of two spheres, equation of a circle, sphere through a given circle, intersection of a sphere and a line, tangent plane, plane of contact, polar plane
Pole of a plane, conjugate points, conjugate planes, angle of intersection of two spheres, conditions for two spheres to be orthogonal, power of a point, radical plane
Co-axial system of spheres, simplified form of the equation of two spheres, definition of a cone, vertex, guiding curve, generators, equation of the cone with a given vertex and guiding curve
Equation of cones with vertex at origin are homogeneous, condition that the general equation of the second degree should represent a cone
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 3 mutually perpendicular generators, intersection of a line and a quadric cone
Tangent lines, tangent plane at a point, condition that a plane may touch the cone, reciprocal cones, intersection of two cones with a common vertex

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 Academic Year: 2013 – 14.

Department: Mathematics Paper: 2A, Abstract Algebra & Real Analysis
 Class: II BSc Semester: III

Binary operations ,definitions and properties ,Groups-definition and elementary properties ,finite groups and group composition tables.
Subgroups and cyclic subgroups ,permutations ,functions and permutations,groups of permutations ,cycles and cyclic notation. Practical.
Even and odd permutations ,the alternating groups ,cyclic groups :elementary properties ,the classification of cyclic groups. Practical.
Subgroups of finite cyclic groups ,isomorphism -definition and elementary properties, Cayley's theorem ,groups of cosets ,applications.
Normal subgroups :factor groups, criteria for the existence of a coset group ,inner automorphism and normal subgroups.
Factor groups and simple groups , homomorphism :definition and elementary properties ,the fundamental theorem of homomorphism ,applications. Practical.
The completeness properties of \mathbb{R} . Practical.
Applications of the supremum property.
Sequences and series
Sequence and their limits ,limit theorems ,monotonic sequences and the Bolzano – Weierstrass theorem.
The Cauchy's criterion. Practical.
Properly divergent sequences.
Introduction to series ,absolute convergence.
Test for absolute convergence. Practical.
Test for non absolute convergence. Practical.

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 Academic Year: 2014 – 15.

Department: Mathematics Paper: 2A Solid geometry&Real analysis
 Class: II BSc Semester: III

Coordinates of a point in \mathbb{R}^3 , Distance between two points, section formula.
Angle between two lines, equation of a plane, shortest distance from a point to a plane and related results.
Angle between two planes, plane bisecting the angles between two planes, joint equation of two planes.
Projection on a plane, symmetric form of equation of a line changing the equations of a line in to symmetric form.
Angle between a line and a plane, incidence and coplanarity skew lines and the shortest distance between them.
Length of the perpendicular from a point to a line, equation of sphere, plane sections, circle.
Tangent planes and tangent lines, polar plane and intersection of two spheres, radical plane.
Coaxial systems, algebraic operations on functions, Bounded and unbounded functions, limit of a function.
Algebra of limits, one sided limits, right handed and left handed limits.
Limits at infinity and infinite limits, continuous functions discontinuity of functions.
Algebra of continuous functions, criteria for continuity.
some properties of continuity of functions at a point
Properties of functions continuous in closed finite intervals, uniform continuity
Derivability of a function, A necessary condition for the existence of a finite derivative.
Algebra of derivative, Geometrical meaning of the derivative
Meaning of the sign of derivative at a point, Darboux's theorem.

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 Academic Year: 2015 – 16 .

Department: Mathematics Paper: 2A Solid Geometry & Real analysis
 Class: II BSc Semester: III

Coordinates of a point in \mathbb{R}^3 , Distance between two points, section formula.
Angle between two lines, equation of a plane, shortest distance from a point to a plane and related results .
Angle between two planes, plane bisecting the angles between two planes, joint equation of two planes .
Projection on a plane, symmetric form of equation of a line changing, the equations of a line in to symmetric form .
Angle between a line and a plane incidence and coplanarity, skew lines and the shortest distance between them .
Length of the perpendicular from a point to a line, equation of sphere, plane sections, circle .
Tangent planes and tangent lines, polar plane, and intersection of two spheres radical plane .
Coaxial systems, algebraic operations on functions, Bounded and unbounded functions, limit of a function .
Algebra of limits, one sided limits, right handed and left handed limits .
Limits at infinity and infinite limits, continuous functions, discontinuity of functions .
Algebra of continuous functions, criteria for continuity .
some properties of continuity of functions at a point
Properties of functions continuous in closed finite intervals uniform continuity
Derivability of a function, A necessary condition for the existence of a finite derivative .
Algebra of derivative, Geometrical meaning of the derivative .
Meaning of the sign of derivative at a point
Darboux's theorem

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 Academic Year: 2016 – 17

Department: Mathematics
 Class: II BSc

Paper: 2A, Abstract Algebra
 Semester: 3

Binary operations , Algebraic structure , semi – group , Monoid .
Group definition and elementary properties , finite and infinite groups , examples
Order of a group , composition tables with examples .
Subgroups : complex definition , multiplication of two complexes , inverse of a complex , subgroup definition , 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 , cosets and Lagrange's theorem : cosets definition , properties of cosets .
Index of a subgroup of a finite group , Lagrange's theorem .
Normal subgroups : definition of normal subgroup , proper and improper normal subgroups and Hamilton group .
Criterion subgroup to be a normal subgroup , intersection of two normal subgroups ,
Subgroups of index 2 is a normal subgroup , simple group , quotient group , criterion for the existence of a quotient group .
Homomorphism : definition of homomorphism , image of homomorphism , elementary properties of homomorphism , isomorphism .
Automorphism definition and elementary properties , kernel of a homomorphism , fundamental theorem on homomorphism and applications .
Permutations and Cyclic groups : definition of permutation , permutation multiplication , inverse of a permutation .
Cyclic permutations , transposition , even and odd permutations , Cayley's theorem .
ADDITIONAL INPUT :
Construction of finite non abelian group , symmetries of geometrical figures , Cyclic groups : definition of cyclic group
Elementary properties , classification of cyclic groups .

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 Academic Year: 2017 – 18

Department: Mathematics

Paper: 2A, Abstract Algebra

Class: II BSc

Semester: 3

Binary operations , Algebraic structure , semi – group , Monoid .
Group definition and elementary properties , finite and infinite groups , examples
Order of a group , composition tables with examples .
Subgroups : complex definition , multiplication of two complexes , inverse of a complex , subgroup definition , 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 , cosets and Lagrange's theorem : cosets definition , properties of cosets .
Index of a subgroup of a finite group , Lagrange's theorem .
Normal subgroups : definition of normal subgroup , proper and improper normal subgroups and Hamilton group .
Criterion subgroup to be a normal subgroup , intersection of two normal subgroups ,
Subgroups of index 2 is a normal subgroup , simple group , quotient group , criterion for the existence of a quotient group .
Homomorphism : definition of homomorphism , image of homomorphism , elementary properties of homomorphism , isomorphism .
Automorphism definition and elementary properties , kernel of a homomorphism , fundamental theorem on homomorphism and applications .
Permutations and Cyclic groups : definition of permutation , permutation multiplication , inverse of a permutation .
Cyclic permutations , transposition , even and odd permutations , Cayley's theorem .
ADDITIONAL INPUT :
Construction of finite non abelian group , symmetries of geometrical figures , Cyclic groups : definition of cyclic group
Elementary properties
Classification of cyclic groups

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 Academic Year: 2018 – 19.

Department: Mathematics

Paper: 2A, Abstract Algebra

Class: II BSc

Semester: 3

Binary operations , Algebraic structure , semi – group , Monoid .
Group definition and elementary properties , finite and infinite groups , examples
Order of a group , composition tables with examples .
Subgroups : complex definition , multiplication of two complexes , inverse of a complex , subgroup definition , 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 , cosets and Lagrange's theorem : cosets definition , properties of cosets .
Index of a subgroup of a finite group , Lagrange's theorem .
Normal subgroups : definition of normal subgroup , proper and improper normal subgroups and Hamilton group .
Criterion subgroup to be a normal subgroup , intersection of two normal subgroups ,
Subgroups of index 2 is a normal subgroup , simple group , quotient group , criterion for the existence of a quotient group .
Homomorphism : definition of homomorphism , image of homomorphism , elementary properties of homomorphism , isomorphism .
Automorphism definition and elementary properties , kernel of a homomorphism , fundamental theorem on homomorphism and applications .
Permutations and Cyclic groups : definition of permutation , permutation multiplication , inverse of a permutation .
Cyclic permutations , transposition , even and odd permutations , Cayley's theorem .
ADDITIONAL INPUT :
Construction of finite non abelian group , symmetries of geometrical figures , Cyclic groups : definition of cyclic group
Elementary properties , classification of cyclic groups .

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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Department: Mathematics Paper: Abstract Algebra&Real Analysis, IIB
Class: II BSc Semester: 4

Definition and basic properties, fields
Integral domains, divisors of zero and cancellation laws,integral domains ,the characteristic of a ring . Practical .
some non-commutative rings , examples
matrices over a field, the real quaternions
Quotient rings and ideals . Practical .
Homomorphism of rings-definition and elementary properties
Maximal and prime ideals, prime fields . Practical .
Rings of polynomials-polynomials in an indeterminate form
The evaluation of homomorphism
Continuous functions, combination of continuous functions,continuous functions on intervals . Practical .
Uniform continuity, the derivative, the mean value theorems
L'Hospital rule, Taylor's theorem,
Riemann integration- Riemann integral Practical.
Riemann integrable functions
Fundamental theorem

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Department: Mathematics Paper: 2B , Abstract Algebra & Real Analysis.
 Class: II BSc Semester: IV

Rings and elementary properties : Definition and example Divisors of zero and cancellation laws .
Integral domains and fields ,The characteristic of a ring non –commutative rings matrices over a field ,Ideals and homomorphism .
Ideals ,factor rings ,Maximal Ideal and prime Ideals .
Homomorphism of rings ,prime fields ,polynomial rings Definition of polynomial ring .
Mean value theorem,,Role’s theorem ,Geometrical interpretation of Rolle’s theorem .
Increasing and decreasing functions ,monotonic functions Cauchy’s mean value theorem ,Generalized mean value theorem .
Taylor’s theorem with schlomitch and Roche , Cauchy’s Lagranges form of remainders
maclaurin’s Infinte series
power series expansions of some standard functions .
Riemann integrability : Introduction ,partitions and Riemann sums, some properties of Darboux sums ,Upper and Lower Riemann integrals .
Riemann integral, another equivalent definition of integrability and integral , Second definition of Riemann integrability .
necessary and sufficient condition for integrability, particular classes of bounded integrable functions .
Integrability of the modulus of a bounded integrable functions definition of $\int_a^b f(x) dx$ if $b \leq a$, inequalities for an integral functions defined by definite integrals.
fundamental theorem of integral calculus , Generalised mean value theorem.
Abel’s lemma , second mean value theorem, change of variable in integral , integration by parts.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2015 – 16.

Department: Mathematics Paper: 2B , Abstract Algebra & Real Analysis.
 Class: II BSc Semester: IV

Rings and elementary properties : Definition and example ,Divisors of zero and cancellation laws .
Integral domains and fields ,The characteristic of a ring non –commutative rings matrices over a field ,Ideals and homomorphism .
Ideals ,factor rings ,Maximal Ideal and prime Ideals .
Homomorphism of rings ,prime fields ,polynomial rings ,Definition of polynomial ring .
Mean value theorem ,Role’s theorem ,Geometrical interpretation of Rolle’s theorem .
Increasing and decreasing functions ,monotonic functions ,Cauchy’s mean value theorem ,Generalized mean value theorem .
Taylor’s theorem with schlomitch and Roche , Cauchy’s Lagranges form of remainders ,Cauchy’s .
Lagrange’s form of remainders , maclaurin’s Infinte series
Infinite series .power series expansions of some standard functions .
Riemann integrability : Introduction ,partitions and Riemann sums and some properties of Darboux ,Upper and Lower Riemann integrals .
Riemann integral another equivalent definition of integrability and integral , Second definition of Riemann integrability .
necessary and sufficient condition for integrability particular classes of bounded ,Integrable functions .
Integrability of the modulus of a bounded integrable functions , definition of $\int_a^b f(x) dx$ if $b \leq a$, Inequalities for an integral functions defined by definite integrals.
fundamental theorem of integral calculus , Generalised mean value theorem.
Abel’s lemma , second mean value theorem change of variable in integral , integration by parts.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P
 Academic Year: 2016 – 17

Department: Mathematics
 BSc

Paper: 2B, Real Analysis

Class: II

Semester: IV

Topics to be covered
Real Numbers : The algebraic and order properties of \mathbb{R} , absolute value and real line , the completeness properties of \mathbb{R} .
Applications of Supremum property , Intervals . 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 sequences , limit point of a sequence , sub-sequences and Bolzano – Weierstress theorem .
Cauchy's sequences Cauchy's general principle .of converges theorem, 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- Alembert's test or ratio test. 4. Alternating series, Leibnitz test. 5. Absolute convergence and conditional convergence, semi convergence .
Continuity : limits , real valued functions , boundedness of a function , limits of functions .
Some extensions of the limit concept.
Infinite limits, limits at infinity . continuous functions : continuous function , combination of continuous function .
Differentiation and mean value theorems : 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 : Role's theorem .
Lagrange's theorem , cauchy's mean value theorem .
Riemann Integration : Riemann integral , Riemann integral functions , Darboux theorem .
Necessary and sufficient for \mathbb{R} – integrability properties of integrable functions.
Fundamental theorem of integral calculus , Integral as a limit of a sum , Mean value theorems.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P
 Academic Year: 2017 – 18

Department: Mathematics
 BSc Semester: IV

Paper: 2B, Real Analysis

Class: II

Real Numbers : The algebraic and order properties of \mathbb{R} , absolute value and real line , the completeness properties of \mathbb{R} .
Applications of Supremum property , Intervals . 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 sequences , limit point of a sequence , sub-sequences and Bolzano – Weierstrass theorem .
Cauchy's sequences Cauchy's general principle .of converges theorem, 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 .
<ol style="list-style-type: none"> 1. P - test 2. Cauchy's nth root test or root test. 3. D- Alembert's test or ratio test. 4. Alternating series, Leibnitz test. 5. Absolute convergence and conditional convergence, semi convergence .
Continuity : limits , real valued functions , boundedness of a function , limits of functions .
Some extensions of the limit concept.
Infinite limits, limits at infinity . continuous functions : continuous function , combination of continuous function .
Differentiation and mean value theorems : 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 : Role's theorem .
Lagrange's theorem , cauchy's mean value theorem .
Riemann Integration : Riemann integral , Riemann integral functions , Darboux theorem .
Necessary and sufficient for \mathbb{R} – integrability properties of integrable functions.
Fundamental theorem of integral calculus , Integral as a limit of a sum , Mean value theorems.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2018 – 19.

Department: Mathematics
 BSc

Paper: 2B, Real Analysis

Class: II

Semester: IV

Topics to be covered
Real Numbers : The algebraic and order properties of \mathbb{R} , absolute value and real line , the completeness properties of \mathbb{R} .
Applications of Supremum property , Intervals . 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 sequences , limit point of a sequence , sub-sequences and Bolzano – Weierstress theorem .
Cauchy's sequences Cauchy's general principle .of converges theorem, 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 .
<ol style="list-style-type: none"> 1. P - test 2. Cauchy's nth root test or root test. 3. D- Alembert's test or ratio test. 4. Alternating series, Leibnitz test. 5. Absolute convergence and conditional convergence, semi convergence .
Continuity : limits , real valued functions , boundedness of a function , limits of functions .
Some extensions of the limit concept.
Infinite limits, limits at infinity . continuous functions : continuous function , combination of continuous function .
Differentiation and mean value theorems : 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 : Role's theorem .
Lagrange's theorem , cauchy's mean value theorem .
Riemann Integration : Riemann integral , Riemann integral functions , Darboux theorem .
Necessary and sufficient for \mathbb{R} – integrability properties of integrable functions.
Fundamental theorem of integral calculus , Integral as a limit of a sum , Mean value theorems.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2013 – 14.

Department: Mathematics

Paper: Linear Algebra, 3A

Class: III BSC

Semester: V

Vector spaces, general properties of vector spaces , n-dimensional vectors, addition and scalar multiplication of vectors ,Internal and external composition .
Vector subspaces, algebra of subspaces ,Linear combination of vectors, linear span of a set Practical..
linear sum of two subspaces , Linear independence and dependence of vectors . practical.
Basis of vector space, Finite dimensional vector spaces, dimension of vector space.
dimension of subspace ,Homomorphism of vector spaces, Isomorphism of vector spaces, quotient space . practical.
dimension of quotient space , Linear transformations,properties of linear transformations,range and null space of linear transformation. Practical.
Rank and nullity of linear transformations and its applications
Linear transformation as vectors, product of linear transformations, invertible linear transformations
Linear functional, dual space,dual bases,Annihilators,the adjoint of a linear transformation
Sylvester's law of nullity, Characteristic values and characteristic vectors. Practical.
Cayley-Hamilton theorem, Diagonalizable operators. Practical.
Inner product spaces, Euclidean and unitary spaces, length of a vector
Schwartz inequality, orthogonality, orthonormal set
Complete orthonormal set, orthonormal basis, Gram-schmidt orthogonalization process, Bessel's inequality. Practical.
Bessel's inequality, Practical

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2013 – 14.

Department: Mathematics
 Class: III BSc

Paper: 4A ,Numerical Analysis
 Semester: V

Errors in numerical computations , Numbers and their accuracy, Errors and their computation ,
Absolute , Relative and percentage errors. A general error formula . Practical .
error in a series approximation, Solution of algebraic and transcendental equations: Practical.
Bisection ,the method of falsi position .
The iteration method , the Newton – Raphson method.
Generalized Newton -Raphson method , Ramanujan’s method Muller’s method . Practical
interpolation :forward differences ,backward differences , central differences , symbolic relations.
Detection of errors by use of D – tables ,differences of polynomial . Practical.
Newton’s forward interpolation formula ,Newton’s backward interpolation formula . Practical.
Gauss’s central difference formula ,stirling’s central difference formula , Additional input:Bessel’s central difference formula .
Everett’s central difference formula , Divided differences and their properties . Practical.
Lagrange’s formula ,errors in Lagrange’s formula .
Derivation of governing equations , end conditions,
Newton’s general interpolation, Practical

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2013 – 14.

Department: Mathematics Paper: 4A ,Discrete Mathematics
Class: III BSc Semester: V

Sets and operations of sets, Relations and functions.
Some methods of proof . Practical.
Problem Solving strategies.
Fundamentals of logic.
Logical inference. Practical.
Methods of proof of an implication, first order logic and other methods of proof. Practical.
Rules of inference for quantified propositions.
Mathematical induction ,the principle of inclusion-exclusion.
Generating functions of sequences , calculating coefficients of generating functions.
Recurrence relations ,solving recurrence relations by substitution. Practical.
Generating functions , the method of characteristic roots. Practical.
Solutions of inhomogeneous recurrence relations .
Relations and directed graphs ,special properties of binary relations. Practical.
Equivalence relations , ordering relations Practical.
Latice and enumerations

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2014 – 15.

Department: Mathematics

Paper: Linear Algebra, 3A

Class: III BSC

Semester: V

Vector spaces, general properties of vector spaces
n-dimensional vectors, addition and scalar multiplication of vectors, Internal and external composition
Vector subspaces, algebra of subspaces . Practical.
Linear combination of vectors, linear span of a set, linear sum of two subspaces
Linear independence and dependence of vectors, Basis of vector space. Practical.
Finite dimensional vector spaces, dimension of vector space, dimension of subspace
Homomorphism of vector spaces, Isomorphism of vector spaces, quotient space, dimension of quotient space. Practical.
Linear transformations, properties of linear transformations, range and null space of linear transformation. Practical.
Rank and nullity of linear transformations and its applications
Linear transformation as vectors, product of linear transformations, invertible linear transformations
Singular and non singular transformations, Matrix of a linear transformation, the adjoint of a linear transformation,
Sylvester's law of nullity, Characteristic values and characteristic vectors. Practical.
Cayley-Hamilton theorem, Diagonalizable operators. Practical.
Inner product spaces, Euclidean and unitary spaces, length of a vector
Schwartz inequality, orthogonality, orthonormal set. Practical.
Complete orthonormal set, orthonormal basis, Gram-schmidt orthogonalization process
Bessel's inequality

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2014 – 15.

Department: Mathematics

Paper: 4A ,Numerical Analysis.

Class: III BSc

Semester: V

Errors in numerical computations. Practical.
Numbers and their accuracy.
Errors and their computation ,Absolute , Relative and percentage errors. Practical.
A general error formula , error in a series approximation. Practical.
Solution of algebraic and transcendental equations.
Bisection ,the method of falsi position .
The iteration method , the Newton – Raphson method.
Generalized Newton – Raphson method , Ramanujan’s method , interpolatrion , forward differences. Practical.
Backward differences , central differences , symbolic relations. Practical.
Detection of errors by use of D – tables ,differences of polynomial .
Newton’s forward interpolation formula ,Newton’s backward interpolation formula .
Gauss’s central difference formula ,stirling’s difference formula. Practical.
Divided differences and their properties .
Lagrange’s formula ,errors in Lagrange’s formula .
Derivation of governing equations , end conditions.
Newton’s general interpolation. Practical.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2014 – 15.

Department: Mathematics

Paper: 4A ,Discrete Mathematics.

Class: III BSc

Semester: V

Sets and operations of sets.
Sets and operations of sets.
Relations and functions. Practical.
Some methods of proof . Practical.
Problem Solving strategies.
Fundamentals of logic.
Logical inference.
Methods of proof of an implication, first order logic and other methods of proof. Practical.
Rules of inference for quantified propositions.
Mathematical induction ,the principle of inclusion-exclusion.
Generating functions of sequences , calculating coefficients of generating functions.
Recurrence relations ,solving recurrence relations by substitution. Practical.
Generating functions , the method of characteristic roots. Practical.
Solutions of inhomogeneous recurrence relations .
Relations and directed graphs ,special properties of binary relations. Practical.
Equivalence relations , ordering relations ,lattice and enumerations. Practical.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2015 – 16.

Department: Mathematics

Paper: Linear Algebra, 3A

Class: III BSC

Semester: V

Topics to be covered
Vector spaces, general properties of vector spaces
n-dimensional vectors, addition and scalar multiplication of vectors, Internal and external composition
Vector subspaces, algebra of subspaces
Linear combination of vectors, linear span of a set, linear sum of two subspaces
Linear independence and dependence of vectors, Basis of vector space
Finite dimensional vector spaces, dimension of vector space, dimension of subspace
Homomorphism of vector spaces, Isomorphism of vector spaces, quotient space, dimension of quotient space
Linear transformations, properties of linear transformations, range and null space of linear transformation
Rank and nullity of linear transformations and its applications
Linear transformation as vectors, product of linear transformations, invertible linear transformations
Singular and non singular transformations, Matrix of a linear transformation, the adjoint of a linear transformation,
Sylvester's law of nullity, Characteristic values and characteristic vectors
Cayley-Hamilton theorem, Diagonalizable operators
Inner product spaces, Euclidean and unitary spaces, length of a vector
Schwartz inequality, orthogonality, orthonormal set
Complete orthonormal set, orthonormal basis, Gram-schmidt orthogonalization process, Bessel's inequality

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2015 – 16.

Department: Mathematics

Paper: 4A, Numerical Analysis.

Class: III BSc

Semester: V

Errors in numerical computations.
Numbers and their accuracy.
Errors and their computation ,Absolute , Relative and percentage errors.
A general error formula , error in a series approximation.
Solution of algebraic and transcendental equations.
Bisection ,the method of falsi position .
The iteration method , the Newton – Raphson method.
Generalized Newton – Raphson method , Ramnujan’s method , interpolatrion , forward differences.
Backward differences , central differences , symbolic relations.
Detection of errors by use of D – tables ,differences of polynomial .
Newton’s forward interpolation formula ,Newton’s backward interpolation formula .
Gauss’s central difference formula ,stirling’s difference formula.
Divided differences and their properties .
Lagrange’s formula ,errors in Lagrange’s formula .
Derivation of governing equations , end conditions.
Newton’s general interpolation.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2015 – 16.

Department: Mathematics

Paper: 4A ,Discrete Mathematics

Class: III BSc

Semester: V

Sets and operations of sets.
Sets and operations of sets.
Relations and functions.
Some methods of proof .
Problem Solving strategies.
Fundamentals of logic.
Logical inference.
Methods of proof of an implication, first order logic and other methods of proof.
Rules of inference for quantified propositions.
Mathematical induction ,the principle of inclusion-exclusion.
Generating functions of sequences , calculating coefficients of generating functions.
Recurrence relations ,solving recurrence relations by substitution.
Generating functions , the method of characteristic roots.
Solutions of inhomogeneous recurrence relations .
Relations and directed graphs ,special properties of binary relations.
Equivalence relations , ordering relations ,lattice and enumerations.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Annual Curricular Plan for the Academic Year: 2016 – 17.

Department: Mathematics

Paper: Linear Algebra, 3A

Class: III BSC

Semester: V

Vector spaces, general properties of vector spaces
n-dimensional vectors, addition and scalar multiplication of vectors, Internal and external composition
Vector subspaces, algebra of subspaces
Linear combination of vectors, linear span of a set, linear sum of two subspaces
Linear independence and dependence of vectors, Basis of vector space
Finite dimensional vector spaces, dimension of vector space, dimension of subspace
Homomorphism of vector spaces, Isomorphism of vector spaces, quotient space, dimension of quotient space
Linear transformations, properties of linear transformations, range and null space of linear transformation
Rank and nullity of linear transformations and its applications
Linear transformation as vectors, product of linear transformations, invertible linear transformations
Singular and non singular transformations, Matrix of a linear transformation, the adjoint of a linear transformation,
Sylvester's law of nullity, Characteristic values and characteristic vectors
Cayley-Hamilton theorem, Diagonalizable operators
Inner product spaces, Euclidean and unitary spaces, length of a vector
Schwartz inequality, orthogonality, orthonormal set
Complete orthonormal set, orthonormal basis, Gram-schmidt orthogonalization process, Bessel's inequality

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2016 – 17.

Department: Mathematics

Paper: 4A, Numerical Analysis.

Class: III BSc

Semester: V

Errors in numerical computations.
Numbers and their accuracy.
Errors and their computation ,Absolute , Relative and percentage errors.
A general error formula , error in a series approximation.
Solution of algebraic and transcendental equations.
Bisection ,the method of falsi position .
The iteration method , the Newton – Raphson method.
Generalized Newton – Raphson method , Ramnujan’s method , interpolatrion , forward differences.
Backward differences , central differences , symbolic relations.
Detection of errors by use of D – tables ,differences of polynomial .
Newton’s forward interpolation formula ,Newton’s backward interpolation formula .
Gauss’s central difference formula ,stirling’s difference formula.
Divided differences and their properties .
Lagrange’s formula ,errors in Lagrange’s formula .
Derivation of governing equations , end conditions.
Newton’s general interpolation.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2016 – 17.

Department: Mathematics

Paper: 4A ,Discrete Mathematics

Class: III BSc

Semester: V

Sets and operations of sets.
Sets and operations of sets.
Relations and functions.
Some methods of proof .
Problem Solving strategies.
Fundamentals of logic.
Logical inference.
Methods of proof of an implication, first order logic and other methods of proof.
Rules of inference for quantified propositions.
Mathematical induction ,the principle of inclusion-exclusion.
Generating functions of sequences , calculating coefficients of generating functions.
Recurrence relations ,solving recurrence relations by substitution.
Generating functions , the method of characteristic roots.
Solutions of inhomogeneous recurrence relations .
Relations and directed graphs ,special properties of binary relations.
Equivalence relations , ordering relations ,lattice and enumerations.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2017 – 18.

Department: Mathematics Paper: Ring Theory & Vector Calculus, 3A
Class: III BSc Semester: V

Abstract algebra : Introduction, basics
Revision of groups, subgroups, cosets and lagrange's theorem, normal subgroups ,cyclic groups
Definition of a ring and basic properties, Boolean rings, divisors of zero, cancellation laws
Integral domains, division ring, field, the characteristic of a ring, the characteristic of a field, subrings
Ideals, principal ideals, quotient rings, Euclidean rings
Definition of a homomorphism, homomorphic image, elementary properties of homomorphism
Kernel of a homomorphism, fundamental theorem of homomorphism
Maximal ideals, prime ideals
Vector differentiation, ordinary derivatives of vectors
Differentiability, gradient, divergence, curl
Formulae involving these operators, vector integration
Line integral, surface integral
Volume integral with examples,
Gauss divergence theorem and applications
Green's theorem and applications
Stoke's theorem
Applications of stoke's theorem

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P
Academic Year: 2017 – 18

Department: Mathematics

Paper: Linear Algebra, 4A

Class: III BSc

Semester: V

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
Basis of vector space, Finite dimensional vector spaces
Basis extension, coordinates
Dimension of a vector space, dimension of a subspace
Quotient space and dimension of quotient space
Linear transformations, linear operators, properties of linear transformations, sum and product of linear transformations, Algebra of linear operators
Range and null space of linear transformation, Rank and nullity of linear transformation
Rank-nullity theorem, linear equations
Characteristic roots, characteristic values & vectors of square matrix, Cayley-Hamilton theorem
Inner product spaces, Euclidean and unitary spaces, norm of a vector, Schwarz inequality
Triangle inequality, parallelogram law, orthogonality
Orthonormal set, complete orthonormal set
Gram-Schmidt orthogonalisation process
Bessel's inequality, Parseval's identity

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)

(A College with Potential for Excellence)

Bhimavaram, W.G.DIST. A.P.

Academic Year: 2018 – 19.

Department: Mathematics

Paper: Ring theory & vector calculus, 3A

Class: III BSc

Semester: V

Topics to be covered
Abstract algebra : Introduction, basics
Revision of groups, subgroups, cosets and Lagrange's theorem, normal subgroups, cyclic groups
Definition of a ring and basic properties, Boolean rings, divisors of zero, cancellation laws
Integral domains, division ring, field, the characteristic of a ring, the characteristic of a field, subrings
Ideals, principal ideals, quotient rings, Euclidean rings
Definition of a homomorphism, homomorphic image, elementary properties of homomorphism
Kernel of a homomorphism, fundamental theorem of homomorphism
Maximal ideals, prime ideals
Vector differentiation, ordinary derivatives of vectors
Differentiability, gradient, divergence, curl
Formulae involving these operators, vector integration
Line integral, surface integral
Volume integral with examples,
Gauss divergence theorem and applications
Green's theorem and applications
Stoke's theorem and applications

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2018 – 19.

Department: Mathematics

Paper: Linear Algebra, 4A

Class: III BSc

Semester: V

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
Basis of vector space, Finite dimensional vector spaces
Basis extension, coordinates
Dimension of a vector space, dimension of a subspace
Quotient space and dimension of quotient space
Linear transformations, linear operators, properties of linear transformations, sum and product of linear transformations, Algebra of linear operators
Range and null space of linear transformation, Rank and nullity of linear transformation
Rank-nullity theorem, linear equations
Characteristic roots, characteristic values & vectors of square matrix, Cayley-Hamilton theorem
Inner product spaces, Euclidean and unitary spaces, norm of a vector, Schwarz inequality
Triangle inequality, parallelogram law, orthogonality
Orthonormal set, complete orthonormal set
Gram-Schmidt orthogonalisation process, Bessel's inequality, Parseval's identity

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2013 – 14.

Department: Mathematics Paper: Multiple integrals & Vector Calculus (3B)
 Class: III BSc Semester: VI

Introduction, the concept of a plane curve, Introduction to line integrals, properties of line integrals, examples
Sufficient condition for the existence of line integral, the area of a subset . Practical
Introduction to double integrals, Darboux's theorem, necessary and sufficient condition for integrability, double integral over a rectangle of a limit of sum. Practical
Problems on double integrals, integration over non rectangular, change of order of integration and its applications
Fubini's theorem, Jordan's theorem, change of variable in a double integration. Practical
Introduction to length of the curves, Rectifiability of a curve, property of rectifiable curves, surface areas. Practical
Introduction to vector differentiation, derivative of a vector function, theorems, partial differentiation. Practical
Differential operator-directional derivative at a point
Gradient of a scalar point function and its applications, divergence of a vector, solenoidal vector, laplacian operator, curl of a vector
Irrotational vector, problems on divergence and curl of a vector. Practical
Vector identities, theorems, Introduction to vector integration, definite integrals, line integrals and its applications. Practical
Surface integrals, Volume integrals and its applications
Gauss divergence theorem and its applications. Practical
Green's theorem, Stoke's theorem and its applications

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2013 – 14.

Department: Mathematics Paper: 4B ,Numerical Analysis
 Class: III BSc Semester: VI

Curve Fitting : Least squares curve fitting procedures ,fitting a straight line ,non linear curve fitting .
Curve fitting by a sum of exponentials ,numerical differentiation , errors in numerical differentiation , maximum and minimum values of a tabulated functions. Practical.
Numerical integration : Trapezoidal rule , simpson's 1/3 rule , simpson's 3/8 rule. Practical.
Boole's rule and weddle's rule , linear systems of equations.
Solution of linear systems – direct methods . Practical
matrix inversion method ,Gauss elimination method . practical.
method of factorisation ,ill - conditioned linear systems iterative methods practical.
Jacobi's method.
Gauss siedal method .
Numerical solution of ordinary differential equations : Introduction, Solution by Taylor's series. Practical.
picards method of successive approximations . Practical.
Euler's method ,modified Euler's method.
Runge – kutta methods .
Predictor-corrector methods .
Milne's method. Additional input:Revised Euler's method. Practical.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2013 – 14.

Department: Mathematics Paper: 4B ,Discrete Mathematics.
Class: III BSc Semester: VI

Basic concepts , isomorphisms and sub graphs.
Trees and their properties. Practical.
Spanning trees , directed trees. Practical.
Binary trees .
Planar graphs, Euler's formula. Practical.
Multi graphs and Euler circuits. Practical.
Hamiltonian graphs. Practical.
Chromatic numbers .
the four color problem
Introduction, Boolean algebras , Switching mechanisms. Practical.
Boolean functions ,Minimization of Boolean functions.
Additional input: Network flows: graphs as model of flow of commodities.
Flows. Practical.
Maximal flows and minimal cuts. Practical

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2014 – 15.

Department: Mathematics Paper: Multiple integrals & Vector Calculus (3B)
 Class: III BSc Semester: VI

Introduction, the concept of a plane curve, Introduction to line integrals, properties of line integrals, examples
Sufficient condition for the existence of line integral, the area of a subset . Practical.
Introduction to double integrals, Darboux's theorem, necessary and sufficient condition for integrability, double integral over a rectangle of a limit of sum Practical.
Problems on double integrals, integration over non rectangular, change of order of integration and its applications
Fubini's theorem, Jordan's theorem, change of variable in a double integration. Practical.
Introduction to length of the curves, Rectifiability of a curve, property of rectifiable curves, surface areas. Practical.
Introduction to vector differentiation, derivative of a vector function, theorems, partial differentiation
Differential operator-directional derivative at a point
Gradient of a scalar point function and its applications, divergence of a vector, solenoidal vector, laplacian operator, curl of a vector
Irrrotational vector, problems on divergence and curl of a vector. Practical.
Vector identities, theorems, Introduction to vector integration, definite integrals, line integrals and its applications. Practical.
Surface integrals, Volume integrals and its applications. Practical.
Gauss divergence theorem and its applications
Green's theorem, Stoke's theorem and its applications. Practical.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2014 – 15.

Department: Mathematics Paper: 4B, Numerical Analysis.
 Class: III BSc Semester: VI

Curve Fitting : Least squares curve fitting procedures ,fitting a straight line ,non linear curve fitting .
Curve fitting by a sum of exponentials ,numerical differentiation , errors in numerical differentiation , maximum and minimum values of a tabulated functions. Practical.
Numerical integration : Trapezoidal rule , simpson's 1/3 rule , simpson's 3/8 rule. Practical.
Boole's rule and weddle's rule , linear systems of equations.
Solution of linear systems :direct methods . Practical.
matrix inversion method ,Gauss elimination method . practical.
method of factorisation ,ill – conditioned linear systems,iterative methods . Jacobi's method.
Gauss siedal method ,numerical solution of ordinary differential equations : Introduction
Solution by Taylor's series. Practical.
Solution by Taylor's series , picards method of successive approximations . Practical.
Euler's method ,modified Euler's method. Practical.
Runge – kutta methods .
Predictor-corrector methods . Practical.
Milne's method.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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Bhimavaram, W.G.DIST. A.P.
Academic Year: 2014 – 15.

Department: Mathematics Paper: 4B ,Discrete Mathematics.
Class: III BSc Semester: VI

Basic concepts , isomorphisms and subgraphs.
Trees and their properties.
Spanning trees , directed trees. Practical.
Binary trees . Practical.
Planar graphs, Euler's formula. Practical.
Multi graphs and Euler circuits. Practical.
Hamiltonian graphs. Practical.
Chromatic numbers . the four color problem
Introduction, Boolean algebras ,Switching mechanisms. Practical.
Boolean functions ,Minimization of Boolean functions. Practical.
Additional input: Network flows: graphs as model of flow of commodities.
Flows.
Maximal flows and minimal cuts. Practical.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2015 – 16.

Department: Mathematics Paper: Multiple integrals & Vector Calculus
 (3B) Class: III BSc Semester: VI

Introduction, the concept of a plane curve, Introduction to line integrals, properties of line integrals, examples
Sufficient condition for the existence of line integral, the area of a subset of
Introduction to double integrals, Darboux's theorem, necessary and sufficient condition for integrability, double integral over a rectangle of a limit of sum
Problems on double integrals, integration over non rectangular, change of order of integration and its applications
Fubini's theorem, Jordan's theorem, change of variable in a double integration
Introduction to length of the curves, Rectifiability of a curve, property of rectifiable curves, surface areas
Introduction to vector differentiation, derivative of a vector function, theorems, partial differentiation
Differential operator-directional derivative at a point
Gradient of a scalar point function and its applications, divergence of a vector, solenoidal vector, laplacian operator, curl of a vector
Irrrotational vector, problems on divergence and curl of a vector
Vector identities, theorems, Introduction to vector integration, definite integrals, line integrals and its applications
Surface integrals, Volume integrals and its applications
Gauss divergence theorem and its applications
Green's theorem, Stoke's theorem and its applications

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram, W.G.DIST. A.P.
Academic Year: 2015 – 16.

Department: Mathematics Paper: 4B , Numerical Analysis.
Class: III BSc Semester: VI

Curve Fitting : Least squares curve fitting procedures ,fitting a straight line ,non linear curve fitting .
Curve fitting by a some of exponentials ,numerical differentiation , errors in numerical differentiation , maximum and minimum values of a tabulated functions.
Numerical integration : Trapezoidal rule , simpson's 1/3 rule , simpson's 3/8 rule.
Boole's rule and weddle's rule , linear systems of equations.
Solution of linear systems – direct methods .
matrix inversion method ,Gauss elimination method .
method of factorisation ,ill – conditioned linear systems ,iterative methods .
Jacobi's method.
Gauss siedal method ,numerical solution of ordinary differential equations : Introduction
Solution by Taylor's series.
Solution by Taylor's series , picards method of successive approximations .
Euler's method ,modified Euler's method.
Runge – kutta methods .
Predictor-corrector methods .
Milne's method.

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Bhimavaram, W.G.DIST. A.P.
Academic Year: 2015 – 16.

Department: Mathematics Paper: 4B ,Discrete Mathematics.
Class: III BSc Semester: VI

Basic concepts , isomorphisms and subgraphs.
Trees and their properties.
Spanning trees , directed trees.
Binary trees .
Planar graphs, Euler's formula.
Multi graphs and Euler circuits.
Hamiltonian graphs.
Chromatic numbers .
the four color problem ,Introduction .
Boolean algebras ,Switching mechanisms.
Boolean functions ,Minimization of Boolean functions.
Additional input: Network flows: graphs as model of flow of commodities.
Flows.
Maximal flows and minimal cuts.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2016 – 17.

Department: Mathematics Paper: Multiple integrals & Vector Calculus
 (3B) Class: III BSc Semester: VI

Introduction, the concept of a plane curve, Introduction to line integrals, properties of line integrals, examples
Sufficient condition for the existence of line integral, the area of a subset of
Introduction to double integrals, Darboux's theorem, necessary and sufficient condition for integrability, double integral over a rectangle of a limit of sum
Problems on double integrals, integration over non rectangular, change of order of integration and its applications
Fubini's theorem, Jordan's theorem, change of variable in a double integration
Introduction to length of the curves, Rectifiability of a curve, property of rectifiable curves, surface areas
Introduction to vector differentiation, derivative of a vector function, theorems, partial differentiation
Differential operator-directional derivative at a point
Gradient of a scalar point function and its applications, divergence of a vector, solenoidal vector, laplacian operator, curl of a vector
Irrrotational vector, problems on divergence and curl of a vector
Vector identities, theorems, Introduction to vector integration, definite integrals, line integrals and its applications
Surface integrals, Volume integrals and its applications
Gauss divergence theorem and its applications
Green's theorem, Stoke's theorem and its applications

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Academic Year: 2016 – 17.

Department: Mathematics Paper: 4B , Numerical Analysis.
Class: III BSc Semester: VI

Curve Fitting : Least squares curve fitting procedures ,fitting a straight line ,non linear curve fitting .
Curve fitting by a some of exponentials ,numerical differentiation , errors in numerical differentiation , maximum and minimum values of a tabulated functions.
Numerical integration : Trapezoidal rule , simpson's 1/3 rule , simpson's 3/8 rule.
Boole's rule and weddle's rule , linear systems of equations.
Solution of linear systems – direct methods .
matrix inversion method ,Gauss elimination method .
method of factorisation ,ill – conditioned linear systems ,iterative methods .
Jacobi's method.
Gauss siedal method ,numerical solution of ordinary differential equations : Introduction
Solution by Taylor's series.
Solution by Taylor's series , picards method of successive approximations .
Euler's method ,modified Euler's method.
Runge – kutta methods .
Predictor-corrector methods .
Milne's method.

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Academic Year: 2016 – 17.

Department: Mathematics Paper: 4B ,Discrete Mathematics.
Class: III BSc Semester: VI

Basic concepts , isomorphisms and subgraphs.
Trees and their properties.
Spanning trees , directed trees.
Binary trees .
Planar graphs, Euler's formula.
Multi graphs and Euler circuits.
Hamiltonian graphs.
Chromatic numbers .
the four color problem ,Introduction .
Boolean algebras ,Switching mechanisms.
Boolean functions ,Minimization of Boolean functions.
Additional input: Network flows: graphs as model of flow of commodities.
Flows.
Maximal flows and minimal cuts.

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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Bhimavaram, W.G.DIST. A.P.
Academic Year: 2017 – 18.

Department: Mathematics

Paper: 3B, Numerical Analysis

Class: III BSc

Semester: V

Bridge Course, Errors in numerical computations
Numbers and their accuracy, Errors and their computation, Absolute, relative and percentage errors
A general error formula, error in a series approximation, Solution of Algebraic and transcendental equations, Bisection method and Regula –falsi method
The iteration method, The Newton-Raphson method, Generalised Newton-Raphson method, Ramanujan method, Muller's method
Interpolation: Forward differences, Backward differences, Central differences
Symbolic relations, Detection of errors by use of D-tables
Differences of a polynomial, Newton's forward interpolation formula
Newton's backward interpolation formula-Examples
Gauss's central difference formulae
Stirling's difference formula,
Bessel' formula
Everett's formula
Divided differences and their properties
Relation between divided differences and forward differences, Backward differences , central differences
Lagrange's formula
Error in Lagrange's formula, Newton's general interpolation formula
Inverse interpolation

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram , W.G.DIST. A.P
 Academic Year: 2017 – 18

Department: Mathematics Paper: 4B Advanced Numerical Analysis (cluster)
 Class: III BSc Semester: VI

Curve fitting : least squares curve fitting procedures ,fitting a straight line.
Non linear curve fitting , curve fitting by a sum of exponentials.
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 functions .
Numerical integration : General quadrature formula , Trapezoidal rule , Simpson's 1/3 – rule .
Simpson's 3/8 – rule , Boole's rule and Weddle's rule .
Euler – Maclaurin formula of summation and quadrature , the Euler transformation .
Solutions of simultaneous linear systems of equations .
Solutions of simultaneous linear systems of equations : solution of linear systems – 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 Seidal method
Numerical solution of ordinary differential equations : Solution by Taylor's series , Picard's method of successive approximations .
Euler's method , modified Euler's method , Runge – Kutta second and fourth order methods .

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
 (A College with Potential for Excellence)
 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2017 – 18.

Department: Mathematics Paper: Special functions, 5B,(Cluster)
 Class: III BSc Semester: VI

Hermite polynomial: Hermite differential equation, solution of Hermite equation,
Hermite polynomials, generating functions, other forms for Hermite polynomials
To find first few Hermite polynomials, orthogonal properties of Hermite polynomials,
Recurrence formulae for Hermite polynomials, problems
Laguerre polynomials- Laguerre's differential equations, solution of Laguerre's equation, Laguerre's polynomials ,generating functions
Other forms of laguerre's polynomial, to find first few Laguerre's polynomials, orthogonal properties of laguerre's polynomials, recurrence formulae
Associated laguerre equation, Legendre's equation- definition, solution of legendre's equation, definition of ,general solution of legendre's equation
To show that is the coefficient of in the expansion of Orthogonal properties of legendre's equation, recurrence formula
Rodrigue's formula, problems
Bessel's equation-Definition, solution of Bessel's general differential equation, general solution of Bessel's equation
Integration of Bessel's equation in series for $n=0$, definition of Recurrence formula for
Generating function for , Beta and gamma functions- Euler's integrals, Beta and gamma functions, Elementary properties
Transformations of gamma functions, another form of Beta function
Relation between Beta and gamma functions, other transformations

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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Bhimavaram, W.G.DIST. A.P
Academic Year: 2018 – 19

Department: Mathematics

Paper: 3B, Numerical Analysis

Class: III BSc

Semester: VI

Bridge Course
Errors in Numerical computations, Numbers and their accuracy, Errors and their computation, Absolute, relative and percentage errors
A general error formula, error in a series approximation, Solution of Algebraic and transcendental equations, Bisection method and Regula –falsi method
The iteration method, The Newtonj-Raphson method, Generalised Newtonj-Raphson method, Ramanujan method, Muller’s method
Interpolation: Forward differences, Backward differences, Central differences
Symbolic relations, Detection of errors by use of D-tables
Differences of a polynomial, Newton’s forward interpolation formula
Newton’s backward interpolation formula-Examples
Gauss’s central difference formulae
Stirling’s difference formula,
Bessel’ formula
Everett’s formula
Divided differences and their properties
Relation between divided differences and forward differences, Backward differences , central differences
Lagrange’s formula, error in Lagrange’s formula
Newton’s general interpolation formula, Inverse interpolation

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Bhimavaram , W.G.DIST. A.P .
 Academic Year: 2018 – 19.

Department: Mathematics Paper: 4B Advanced Numerical Analysis (cluster)
 class: III BSc Semester: VI

Curve fitting : least squares curve fitting procedures ,fitting a straight line.
Non linear curve fitting , curve fitting by a sum of exponentials.
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 functions .
Numerical integration : General quadrature formula , Trapezoidal rule , Simpson’s 1/3 – rule .
Simpson’s 3/8 – rule , Boole’s rule and Weddle’s rule .
Euler – Maclaurin formula of summation and quadrature , the Euler transformation .
Solutions of simultaneous linear systems of equations .
Solutions of simultaneous linear systems of equations : solution of linear systems – 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 Seidal method
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Euler’s method , modified Euler’s method , Runge – Kutta second and fourth order methods .

DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
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 Bhimavaram, W.G.DIST. A.P.
 Academic Year: 2018 – 19.

Department: Mathematics Paper: Special functions, 5B, Cluster
 Class: III BSc Semester: VI

Hermite polynomial: Hermite differential equation, solution of Hermite equation,
Hermite polynomials, generating functions, other forms for Hermite polynomials
To find first few Hermite polynomials, orthogonal properties of Hermite polynomials,
Recurrence formulae for Hermite polynomials, problems
Laguerre polynomials- Laguerre's differential equations, solution of Laguerre's equation, Laguerre's polynomials ,generating functions
Other forms of laguerre's polynomial, to find first few Laguerre's polynomials, orthogonal properties of laguerre's polynomials, recurrence formulae
Associated laguerre equation, Legendre's equation- definition, solution of legendre's equation, definition of ,general solution of legendre's equation
To show that is the coefficient of in the expansion of Orthogonal properties of legendre's equation, recurrence formula
Rodrigue's formula, problems
Bessel's equation-Definition, solution of Bessel's general differential equation, general solution of Bessel's equation
Integration of Bessel's equation in series for $n=0$, definition of Recurrence formula for
Generating function for , Beta and gamma functions- Euler's integrals, Beta and gamma functions, Elementary properties
Transformations of gamma functions, another form of Beta function
Relation between Beta and gamma functions, other transformations