Department of Mathematics

SRI SAI BABA NATIONAL DEGREE COLLEGE :: ANANTAPUR

About Department

Profile

The Department of Mathematics was established in the year 1981. In that time the mathematics department offered the traditional courses M.P.C. and M.P.S. (E.M. & T.M.). Later the department introduced the self-funding courses M.P.Cs., M.S.Cs., M.E.Cs.& M.IE.Cs.

The department is provided with a well-furnished separate staff room, a departmental library and the required material. The department is equipped with a computer system with printer and Internet facility. The total UG student strength of the department is 930. Around 60% of the students are women, which indicates, the protective atmosphere of the college for women students. Most of the students belong to rural areas and backward sections of the society.

The department also involves itself in taking classes for I & II years B.A., B.com., B.Zc., students to teach the General Mathematics for Non-Mathematics Students under SDC. The department frames its own syllabi in the Board of Studies (BOS) under the guidance of outside experts and gets the same ratified in the Academic Council as the institution is autonomous.

The department works not only for the academic progress of the students but also for their overall development. The pass percentage of the students has been around 90 on an average. The progression of the students has also been excellent. The percentage of students who reach the universities is around 75 for higher education. This is all because of the semester system and also the hard work of the teachers which enable the students to be thorough with the prescribed syllabus and prepare well for internal tests and semester-end examinations. The department also constantly monitors the progress of the students by getting feedback from them with regard to the curriculum teaching-learning-evaluation. The students have liberty to approach the department for any kind of help they needed to understand the subject. The faculty regularly conducts seminars, guest lectures, group discussions, quiz programmes etc. New teaching methods are an integral part of the Department. Remedial classes are conducted for the slow-learners identified by the faculty.

The students express satisfaction with regard to the syllabi, methods of teaching and evaluation. The teachers of the department also act as resource persons, paper setters and examiners for other colleges.

The alumni of the department have been serving in various state, central government and private organizations in such cadres as administrators, lecturers, teachers, advocates, software engineers, bankers, police officers, revenue officers and so on. They often come to the college and meet the present students and share their views with them with regard to the subject and institution. The employers constantly monitor the progress of the department and express happiness about its performance.

Precisely, it can be said that the department has good-facilities with experienced and qualified faculty. It uses innovative methods of teaching with creativity.

Courses Offered:

At present the department is offering B.Sc., with various combinations

1.Mathematics, Physics and Chemistry (EM)

2. Mathematics, Physics and Statistics (EM),

3. Mathematics, Statistics and Computer Science

4. Mathematics, Electronics and Computer Science

5. Mathematics, Physics and Computer Science

6. Mathematics, Industrial Electronics and Computer Science.

DEPARTMENT PHOTOS

Faculty Profile:

E. Mahojani (Head of the Department), B. Malathi, S. Siva Prasad Reddy and Dr. G.N. Rama Krishna are well-qualified and experienced Assistant Professors, well admired by students as the best teachers. They have taken part in faculty development programmes offered by the parent University, other universities, organizations and institutions. They participated in programmes like Refresher Courses, Seminars, Conferences and Workshops to improve their academic standards. The teachers of the department have been actively participating and presenting papers in National and International seminars/ workshops. They have also published articles in reputed journals.

Smt. E. Mahojani

Smt. E. Mahojani, M.Sc., A.P.SET, Head of the Department with 13 years of teaching experience, She has published 3 research papers in National journals and presented papers at national seminars/workshops. Specialization in Algebra, Linear Algebra and Three Dimensional Geometry. She is the member in the WEC.

Smt. B. Malathi

Smt. B. Malathi, M.Sc., B.Ed., P.G.D.C.A., Assistant Professor with 9 years of teaching experience. Participated in national seminars/workshops /Webinars. Specialization in Differential Equations, Laplace Transforms and Real Analysis. She is the member in the WEC.

S. Siva Prasad Reddy

S. Siva Prasad Reddy, M.Sc., B.Ed., Assistant Professor with 8 years of teaching experience. Participated in national seminars/workshops/Webinars. Specialization in Differential Equations, Laplace Transforms and Real Analysis. He is the member in the Invitation Committee.

Dr. G. N. Rama Krishna

Dr. G.N. Rama Krishna, M.Sc., M.Phil., Ph.D.,B.Ed., Assistant Professor with 16 years of teaching experience. He awarded his Doctorate in 2017. He published 10 research papers in National and International journals. Also Participated and presented papers at National seminars/workshops/Webinars. Specialization in Differential Equations, Algebra, Linear algebra and Integral Transforms He is the member in the Time-Table Committee and Career Development Cell.

SSBN DEGREE COLLEGE (AUTONOMOUS) ANANTAPURAMU

B.Sc. MATHEMATICS

REVISED SYLLABUS FOR CORE COURSES

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

CORE COURSES STRUCTURE

(Sem-I to Sem-IV)

Year	Semester	Course	Subject	Hrs	Credits	Internal	External	Total
I	I	Course-I	Differential Equations	6	5	25	75	100
	II	Course-II	Three Dimensional Geometry	6	5	25	75	100
II	III	Course-III	Abstract Algebra	6	5	25	75	100
	IV	Course-IV	Real Analysis	6	5	25	75	100
		Course-V	Linear Algebra	6	5	25	75	100

SSBN DEGREE COLLEGE (AUTONOMOUS), ANANTAPURAMU

B.Sc. MATHEMATICS SYLLABUS UNDER CBCS

(2020-21 Admitted Batch)

I YEAR B.Sc. MATHEMATICS

I SEMESTER

Course-I: DIFFERENTIAL EQUATIONS

Work Load: 75 Hours per Semester

Course Outcomes:

1. After successful completion of this course, the student will be able to Solve linear differential equations
2. Convert non-exact homogeneous equations to exact differential equations by using integrating factors.
3. Know the methods of finding solutions of differential equations of the first order but not of the first degree.
4. Solve higher-order linear differential equations, both homogeneous and nonhomogeneous, with constant coefficients.
5. Understand the concept and apply appropriate methods for solving differential equations.

Course Syllabus:

UNIT – I (12 Hours)

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)

Orthogonal Trajectories

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 homogeneous in x and 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; 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,

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

P.I. of f(D)y = Q when Q is b sinax or b cos ax.

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= $e^{ax}V$ **,** where V is a function of x.

P.I. of f(D)y = Q when Q= xV **,** where V is a function of x.

P.I. of f(D)y = Q when Q= x^mV **,** where V is a function of 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, Legendre's linear equations, miscellaneous differential equations.

Co-Curricular Activities (15 Hours)

Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving.

Text Book:

Differential Equations and Their Applications by Zafar Ahsan, published by Prentice- Hall of India Pvt. Ltd, New Delhi-Second edition.

Reference Books :

1. A text book of Mathematics for B.A/B.Sc, Vol 1, by N. Krishna Murthy & others, published byS.Chand & Company, New Delhi.
2. Ordinary and Partial Differential Equations by Dr. M. D, Raisinghania, published by S. Chand &Company, New Delhi.
3. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
4. Differential Equations -Srinivas Vangala & Madhu Rajesh, published by Spectrum University Press.

Course Outcomes:

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

1. Get the knowledge of planes.
2. Basic idea of lines, sphere and cones.
3. Understand the properties of planes, lines, spheres and cones.
4. Express the problems geometrically and then to get the solution.

Course Syllabus:

UNIT – I (12 Hours)

The Plane :

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

UNIT – II (12 hrs)

The Line :

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.

UNIT – III (12 hrs)

The Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole ofa Plane; Conjugate points; Conjugate planes;

UNIT – IV (12 hrs)

The Sphere and Cones:

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

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

UNIT – V (12 hrs)

Cones:

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

Co-Curricular Activities (15 Hours)

Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving.

Text Book :

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

Reference Books :

1. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, published by S. Chand & Company, New Delhi.
2. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed,published by Wiley Eastern Ltd., 1999.
3. 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.
4. Solid Geometry by B.Rama Bhupal Reddy, published by Spectrum University Press.

Course Outcomes:

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

1. Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
2. Get the significance of the notation of a normal subgroups.
3. Get the behavior of permutations and operations on them.
4. Study the homomorphism and isomorphism with applications.
5. Understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
6. Understand the applications of ring theory in various fields.

Course Syllabus:

UNIT – I (12 Hours)

GROUPS :

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group, Composition tables with examples.

UNIT – II (12 Hours)

SUB - GROUPS :

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition- examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem :

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT –III (12 Hours)

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 –quotient group – criteria for the existence of a quotient group.

HOMOMORPHISM :

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

UNIT – IV (12 Hours)

PERMUTATIONS ANDCYCLIC 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 – elementary properties – classification of cyclic groups.

UNIT – V (12 Hours)

RINGS:

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws 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.

Co-Curricular Activities (15 Hours)

Seminar/ Quiz/ Assignments/ Group theory and its applications / Problem Solving.

Text Book :

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.

Reference Books :

1. Abstract Algebra by J.B. Fraleigh, Published by Narosa publishing house.
2. Modern Algebra by M.L. Khanna.
3. Rings and Linear Algebra by Pundir & Pundir, published by Pragathi Prakashan.

Course Outcomes:

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

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

Course Syllabus:

UNIT – I (12 Hours)

REAL NUMBERS:

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

Real Sequences:

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

UNIT –II (12 Hours)

INFINITIE SERIES :

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

1. P-test
2. Cauchy's n^{th} root test or Root Test.
3. D'-Alemberts' Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence.

UNIT – III (12 Hours)

CONTINUITY :

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

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

UNIT – IV (12 Hours)

DIFFERENTIATION AND MEAN VALUE 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; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – V (12 Hours)

RIEMANN INTEGRATI ON:

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

Co-Curricular Activities(15 Hours)

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

Text Book:

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

Reference Books:

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

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

Course Outcomes:

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

1. Understand the concepts of vector spaces, subspaces, basis, dimension and their properties
2. Understand the concepts of linear transformations and their properties
3. Apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
4. Learn the properties of inner product spaces and determine orthogonality in inner product spaces.

Course Syllabus:

UNIT – I (12 Hours)

Vector Spaces-I:

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

UNIT –II (12 Hours)

Vector Spaces-II:

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

UNIT –III (12 Hours)

Linear Transformations:

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

UNIT –IV (12 Hours)

Matrix :

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

UNIT –V (12 Hours)

Inner product space:

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram– Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Co-Curricular Activities(15 Hours)

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

Text Book:

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

Reference Books :

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

SSBN DEGREE COLLEGE (AUTONOMOUS), ANANTAPURAMU

B.A/ B.Sc./ B.Com FIRST YEAR SYLLABUS

SKILL DEVELOPMENT COURSE -I

SEMESTER-I

ARTHEMETIC ABILITY

Course Outcomes:

1. After successful completion of this course, the student will be able to simply the algebraic operations by using BODMAS rule.
2. To understand LCM and GCD of the numbers and also the simplification of the matrices.

UNIT - I

Number system- Algebraic operations- BODMAS rule- Simplification of fractions – Divisibility rules.

UNIT – II

LCM and GCD- Averages – Ratio and proportions – related simple problems.

UNIT – III

Definition of matrices- Types of matrices – Transpose of matrices – Addition, Subtraction and multiplication of matrices – Determinant of matrices of order 2x2 and 3x3.

Reference Books:

1. Analytical Skills by J. Venkateswara Rao and M. Sirisha (VGS Publications).

2. Telugu academy text book of intermediate I-A.

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SSBN DEGREE COLLEGE (AUTONOMOUS), ANANTAPURAMU

B.A/ B.Sc./ B.Com SECOND YEAR SYLLABUS

SKILL DEVELOPMENT COURSE -III

SEMESTER-III

QUANTITATIVE APTITUDE

Course Outcomes:

1. After successful completion of this course, the student will be able to solve different type problems related to aptitude

UNIT - I

Solving the problems on Ages – time, Distance, Speed .

UNIT – II

Problems solving on Profit, Loss, Percentages – Simple interest .

UNIT – III

Measures of Central Tendency – Arithmetic mean – Median – Mode for grouped and ungrouped data – simple problems.

Reference Books:

1. Analytical Skills by J. Venkateswara Rao and M. Sirisha (VGS Publications).

2. Business Statistics by Kalyani Publications.

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SSBN DEGREE COLLEGE (AUTONOMOUS), ANANTAPURAMU

B.A/ B.Sc. SECOND YEAR SYLLABUS

SKILL DEVELOPMENT COURSE -IV

SEMESTER-III

ALGEBRAIC EQUATIONS

Course Outcomes:

1. After successful completion of this course, the student will be able to solve quadratic and linear equations.

UNIT - I

Definition of linear equation – solving the linear equation in one variable by using algebraic operations.

UNIT – II

Definition of linear equation in two variables - solving the equations of two variable.

UNIT – III

Definition of quadratics equation – finding the roots of the quadratic equation – finding the sum of the roots and product of the roots .

Reference Books:

1. Analytical Skills by J. Venkateswara Rao and M. Sirisha (VGS Publications).

2. Telugu Academy Text book of Intermediate I - A