

DEPARTMENT OF MATHEMATICS

BOS MEETING

2016-17



**Nagarjuna Government College
Nalgonda**

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NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
(Autonomous, Accredited by NAAC with "A" Grade)

DEPARTMENT OF MATHEMATICS

BOARD OF STUDIES MEETING (2016-17)

The members of Board of Studies in Mathematics department, N.G.College, Nalgonda met under the chairmanship of Sri.V.Srinivas Reddy on 20/10/2016 at Department of Mathematics, N.G.College, discussed the following agenda and passed the resolutions.

AGENDA

1. To consider and approve the Choice Based Credit System (Earlier CBCS) and Cumulative Grade Point Average (CGPA) system for B.Sc. II & III Year students (III & IV, V,VI, Semesters) for the academic year 2016-17.
2. To consider and approve the syllabus for B.Sc. I, year (I, II, Semesters with New CBCS) for the academic year 2016-17
3. To consider and approve the syllabus for B.Sc. I, II, III years (I, II, III, IV, V & VI Semesters) for the academic year 2016-17.
4. To consider and approve the modules (Units) and setting of Question papers as 70:30 for Theory External and Internal assignments for B.Sc. I, II & III Year (I,II,III,IV,V&VI Semesters) for the academic year 2016-17.
5. To consider and approve the Syllabus of practical examinations at the end of IV, VI semesters for B.Sc. II & III year students and syllabus of practical examination at End of each Semester for I year students.
6. To consider and approve the model question papers for B.Sc.I, II & III year for the academic year 2016-17.
7. To consider approve the Syllabus general Elective (IDE) in IV Semester
8. To consider and approve the list examiners for paper setting and evaluation for the academic year 2016-17.

Any other related academic matters.

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RESOLUTIONS (2016-17)

1. The Choice Based Credit System (Earlier CBCS) and Cumulative Grade Point Average (CGPA) System can be implemented for the B.Sc. II & III Year (III,IV,V & VI Semesters) students for the academic year 2016-17.
2. The Choice Based Credit System (New CBCS) and Cumulative Grade Point Average (CGPA) System can be implemented for the B.Sc. I Year (I,II Semesters) students for the academic year 2016-17
2. The modules (Units) and allotted Credits is approved for B.Sc. I Year(with New CBCS system, II & III year students with earlier CBCS System for the academic year 2016-17.
3. Unitization of syllabus into 4 units for each paper (module)
4. The evaluation of the students for each semester of I, II, III,IV,V,VI Semesters Consists 100 marks in the ratio of 70:30 External End Theory exam – 70 marks and internal exam consist 30 marks. Two Internal Exams will be conducted for each semester and best of Two will be considered.
5. Approved the syllabus for I, II, III, IV, V, VI, VII & VIII papers and model question papers.
6. Approved to conduct the Practical examinations at the end of IV and VI Semesters for II & III year students and end of each semester for B.Sc. I Year students. Each paper consists 50 marks. The syllabus is approved and followed the practical question bank (as per University Question bank).
7. Approved the Syllabus and Model paper of the General Elective (Fundamentals of Mathematics) in IV Semester.
8. Approval the panel of examiners for paper setting and evaluation for the academic year 2016-17.

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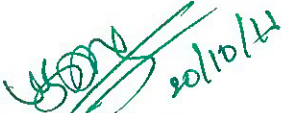



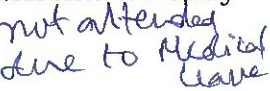



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PANEL OF EXAMINERS (2016-17)

1. Sri B.Madan Mohan, Rtd.Lecturer in Mathematics, GDC, Hayathnagar, Hyderabad.
2. Sri P.Ram Mohan Reddy, Associate Professor in Mathematics, Giriraj GDC, Nizambad.
3. Sri B.Rajender Kumar, Associate Professor in Mathematics, Tara GDC, Sangareddy.
4. Sri K.Anantha Rao, Lecturer in Mathematics, Giriraj GDC, Nizambad.
5. Sri V.Yadaiah, Asst. Professor in Mathematics, GDC, Jogipet.
6. Sri G.Narender Reddy, Asst. Professor in Mathematics, GDC, Ramannapet.
7. Sri P.B.Rajasekhar, Asst. Professor in Mathematics, GDC, Ramannapet.
8. Sri Janaiah, Asst. Professor in Mathematics, MKRGDC, Devarakonda.
9. Sri Venkat Goud, Asst. Professor in Mathematics, MKRGDC, Devarakonda.
10. Sri. Saidi Reddy, Asst. Professor, KRR GDC, Kodad.
11. Dr.Maddileti.P.
12. Sri Dr.G.Upender Reddy, Asst.Professor, MGU, Nalgonda.

SIGNATURES OF THE MEMBERS.

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| 1. V.Srinivas Reddy
 | 2. Dr.Maddileti P.
 | 3. Dr.G.Upender Reddy
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| 4. B.Madan Mohan
Rtd Lecturer
 | 5. A.Keshava Reddy
not attended
due to Medical
leave
 | 6. Dr.S.Upender
 |
| 7. D.Madhukar
Contract Lecturer in maths
N.G.College, Nalgonda.
 | 8. S.Kaniakiah
contract lecturer in mathy
N.G.College, Nalgonda
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NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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ALLOCATION OF CREDITS AT SUBJECT LEVEL (Earlier CBCS System)

Course: SCIENCE

Subject: Mathematics

S. No	Semester	Module (Paper)	Hours Per Week	Max. Marks	Credits
1	I (Core)	Differential Equations	4	100	3
2	II (Core)	Solid Geometry	4	100	3
3	Practical	Differential Equation & Solid Geometry	3	50	2
4	III (Core)	Real Analysis	4	100	3
5	IV(Core)	Abstract Algebra	4	100	3
6	Practical	Real Analysis & Abstract Algebra	3	50	2
7	V (Advanced)	Linear Algebra	4	100	3
8	V (Elective)	i) Numerical Analysis – I ii) Laplace transformation	3	100	2
9	Practical	Linear Algebra, Vector Calculus & Multiple integrals	3	50	2
10	VI (Skill)	Vector calculus & Multiple integrals	4	100	3
11	VI(Elective)	i)Fourier transforms & Series ii) Numerical Analysis-II	3	100	2
12	Practical	Numerical Analysis	3	50	2
13	Project work				1
14	General Elective	Fundamentals of Mathematics	2		2

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SYLLABUS FOR MATHEMATICS
B.Sc. I Year - I Semester – I Paper (w.e.f. 2016-17) (NEW CBCS)

DIFFERENTIAL CALCULUS

Objective: The course is aimed at exposing the students to some basic notions in differential calculus.

Outcome: By the time students completes the course they realize wide ranging applications of the subject.

UNIT – I

Successive differentiation – Expansions of Functions – Mean value theorems.

UNIT – II

Indeterminate forms – Curvature and Evolutes

UNIT – III

Partial differentiation – Homogeneous functions – Total derivative

UNIT – IV

Maxima and Minima of functions of two variables – Lagrange's method of multipliers – Asymptotes – Envelopes

Text: Shanti Narayan and Mittal, Differential Calculus

References: - William Anthony Granville, Percy F Smith and William Raymond Longley; Elements of the differential and integral calculus

Joseph Edwards, Differential calculus for beginners

Smith and Minton, Calculus

Elis Pine, How to Enjoy Calculus

Hari Kishan, Differential Calculus

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SYLLABUS FOR MATHEMATICS

B.Sc. I Year - II Semester – II Paper (w.e.f. 2016-17) (NEW CBCS)

DIFFERENTIAL EQUATIONS

Objective: The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

Outcome: After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

UNIT – I

Differential Equations of first order and first degree:

Exact differential equations – Integrating Factors – Change in variables – Total Differential Equations – Simultaneous Total Differential Equations – Equations of the form $dx/P=dy/Q=dz/R$.

Differential equations first order but not of first degree: Equations Solvable for y – Equations Solvable for x – Equations that do not contain x (or y) – Clairaut's equation.

UNIT – II

Higher order linear differential equations: Solution of homogeneous linear differential equations with constant coefficients – Solution of non-homogeneous differential equations $P(D)y=Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = bx^k, be^{ax}, e^{ax}V, b \cos(ax), b \sin(ax)$

UNIT – III

Method of undetermined coefficients – Method of variation of parameters – Linear differential equations with non constant coefficients – The Cauchy – Euler Equation.

UNIT – IV

Partial Differential equations – Formation and solution – Equations easily integrable – Linear equations of first order – Non linear equations of first order – Chairpit's method – Non homogeneous linear partial differential equations – Separation of variables.

Textg: Zafar Ahsan, Differential Equations and Their Applications

References: Frank Ayres Jr, Theory and Problems of Differential Equations

Ford, L.R, Differential Equations

Daniel Murray, Differential Equations

S.Balachandra Rao, Differential Equations with Applications and Programs

Stuart P Hastings, J Bryce McLead; Classical Methods in Ordinary Differential Equations.

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SYLLABUS FOR MATHEMATICS

B.Sc. II Year - III Semester – III Paper (w.e.f. 2015-16) (EARLIER CBCS)

REAL ANALYSIS

15 Hours

UNIT - I

The Completeness Properties of \mathbb{R} , Applications of the Supremum Property.

Sequences and their limits, limit theorems, Monotonic Sequences, Sub-sequences and the Bolzano-Weirstrass theorem, The Cauchy's Criterion, Properly divergent sequences.

UNIT - II

15 Hours

Introduction to series, Convergence of series, Comparison test, limit comparison test, Root test, Ratio test, Absolute convergence, test for absolute convergence, test for non-absolute convergence

UNIT - III

15 Hours

Continuous Functions-continuous functions, combinations of continuous functions, continuous functions on intervals, Uniform continuity.

The derivative, The mean value theorems, L'Hospital Rule, Taylor's Theorem

UNIT - IV

15 Hours

Riemann Integration-Riemann integral, Riemann integrable functions, Fundamental theorem.

Prescribed text book:

Scope as in "Introduction to Real Analysis", by Robert G. Bartle and Donald R. Sherbert, John Wiley, 3rd edition. Chapter 3, (3.1 to 3.7), Chapter 5 (5.1 to 5.4), Chapter 6 (6.1 to 6.4), Chapter 7 (7.1 to 7.3), Chapter 9 (9.1, 9.2 and 9.3).

Reference books:

1. "A course of Mathematical Analysis", Shanthi Narayan and P.K. Mittal, S.Chand & Company
2. "Mathematical analysis" by S.C. Malik and Savita Arora, Wiley Eastern Ltd.,

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SYLLABUS FOR MATHEMATICS

B.Sc. II Year - IV Semester – IV Paper (w.e.f. 2015-16) (EARLIER CBCS)

ABSTRACT ALGEBRA

UNIT – I

15 Hours

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, even and odd permutations, The alternating groups. Cyclic groups – Elementary properties, The classification of cyclic groups, sub groups of finite cyclic groups.

UNIT – II

15 Hours

Isomorphism – Definition and elementary properties, Cayley's theorem, Groups of cosets, Applicatoins, Normal subgroups – Factor groups, Criteria for the existence of a coset group, Inner automorphisms and normal subgroups, factor and simple groups, Homomorphism – Definition and elementary properties, The fundamental theorem of homomorphisms, applications.

UNIT – III

Rings

15 Hours

Definition and basic properties, Fields, Integral domains, divisors of zero and Cancellation laws, integral domains, The characteristic of a ring, some non-commutative rings examples, Matrices over a field, The real quaternions. Homomorphism of Rings – Definition and elementary properties.

UNIT – IV

15 Hours

Maximal and Prime ideals, Prime fields. Rings of Polynomials – Polynomials in an indeterminate form, The evaluation homomorphism, Euclidean Algorithism.

Prescribed Text Book:

Scope and treatment as in "The First Course in Abstract Algebra" (3rd edition) by Johon B Fraleigh, Narosa Publishing house, Chapter 1 to 7, 11 to 13, 23, 24.1 to 24.3, 25.1, 25.4 and chapter 29 to 31.

Reference Books:

1. "Topics in Algebra", I.N.Herstein, Wiley Eastern
2. "Contemporary Abstract algebra" by Joseph A Gallian, Narosa Publishing House

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SYLLABUS FOR FUNDAMENTALS OF MATHEMATICS (IDE)
(General Elective)

15 Hours

Unit-I:

Set, Subset, Types of sets-operations on sets-Venn Diagram Demorgan Laws
Applications of set Theory – Laws of Indices.

Arithmetic Progressions – Geometric Progressions – Harmonic, Progressions.
Time and Work, Time and Distance

15 Hours

Unit – II:

Differentiation and integration – Elementary knowledge and Simple Problems.

Simple Problems on Areas of triangles, Circles, Square and Rectangle

Meaning and Operations – Matrix Algebra – Types of Matrices – Matrix addition –
Matrix Multiplication – Matrix Determinants – Matrix inversion.

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year - V Semester – V Paper (Advanced) (w.e.f. 2016-17)
(EARLIER CBCS)

LINEAR ALGEBRA

UNIT – I

Vector spaces, General properties of vector spaces, subspaces, Algebra of subspaces, linear combination of vectors. Linear span, linear sum of two subspaces, linear independence of vectors, Basis of vector space. Finite dimensional vector spaces, Dimension of a vector space, Dimension of a subspace.

UNIT - II

Linear transformations, linear operators, Range and null space of linear transformations, Rank and nullity of linear transformations, linear transformations as vectors, Product of linear transformations, Invertible linear transformation.

UNIT – III

The ad-joint or transpose of a linear transformation, Sylvester's law of nullity, characteristic values and characteristic vectors. Cayley Hamilton Theorem, Diagonalizable operators.

UNIT - IV

Inner product spaces, Euclidean and Unitary spaces. Norm or length of a vector, Schwartz inequality, Orthogonally, Orthonormal set. Complete orthonormal set, Gram – Schmidt orthogonal process.

Prescribed text book:

"Linear Algebra" by J.N.Sharma and A.R.Vasista Krishna Prakasham Mandir Meeru 250002.

Reference books:

1. "Linear Algebra" by Kenneth Hoffman and Ray Kunze, Pearson Educatoin (low priced edition), New Delhi.
2. "Linear Algebra" by Stephen H.Friedberg Prentice Hall of India Pvt.Ltd. 4th edition 2007.

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year - V Semester – VI (a) Paper (Elective) w.e.f 2016-17
(EARLIER CBCS)

NUMERICAL ANALYSIS - I

UNIT - I

Errors in Numerical Computations: Numbers and their Accuracy, Errors and their computation, Absolute, Relative and Percentage errors, A general formula, Error in a series function. Solution of Algebraic and Transcendental Equations by bisection method, the Iteration method.

UNIT - II

The method of False position, Newton – Raphson method, Generalized Newton-Raphson, Ramanujan's method, Muller's method.

UNIT - III

Errors in polynomial interpolation, Forward difference, Backward differences, Central differences, Symbolic relations, Detection of errors by use Difference Tables, formula of a polynomial, Newton's formula for interpolation formula.

UNIT - IV

Gauss's central difference formula, Strilings central difference formula, Interpolation with unevenly spaced points Langrange's formula, Error in Langrange's formula, Derivation of governing equations, End conditions, Divided differences and their properties, Newton's general interpolation.

Prescribed text book:

Scope as in "Introductory method of Numerical Analysis" by S.S.Sastry, Prentice Hall India (4th Edition)

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year-V Semester – VI (b) Paper(Elective) w.e.f. 2016-17
(EARLIER CBCS)

LAPLACE TRANSFORMS

UNIT - I

Definition of Laplace transform, linearly property, piecewise continuous function, Existence of Laplace transform, Functions of exponential order and of class A, First and second shifting theorems of Laplace transform, change of scale property, Laplace transform of derivatives, final and initial value theorems, Laplace transform of integrals, multiplication by t, division by t.

UNIT - II

Laplace transform of periodic functions and error function. Beta function and Gamma functions. Definition of inverse Laplace transform, linearity property, first and second shifting theorems of inverse Laplace transform, change of scale property, division by p,

UNIT - III

Convolution theorem, Heavisides expansion formula , Application of Laplace transform to the solution of ordinary differential equations with constant coefficients.

UNIT - IV

Application of Laplace transform to the solutions of ordinary differential equations. with variable coefficients. Simultaneous ordinary differential equations, partial differential equations.

Prescribed Text Book:

Scope as in "integral transform" by A.R.Vasistha and Dr.K.Gupta published by Krishna Prakashan Media Pvt.Ltd., Meerut.

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year - VI Semester – VII Paper (Skill) w.e.f. 2016-17
(EARLIER CBCS)

MULTIPLE INTEGRALS AND VECTOR CALCULUS

UNIT - I

Multiple integrals: Introduction, the concept of a plane. Curve, line integral-sufficient condition for the existence of the integral. The area of a subset of \mathbb{R}^2 . Calculation of double integrals. Jordan curve, Area, Change of the order of integration.

UNIT - II

Double integral as a limit, change of variable in a double integration. Lengths of curves, surface areas, Integral expression for the length of a curve surfaces, surface areas.

UNIT - III

Vector differentiation. Ordinary derivatives of vectors, Space curves, Continuity, Differentiable, Gradient, Divergence, Curl operation. Formula involving these operators.

UNIT - IV

Vector integration, Theorems of Gauss and Stokes, Green's theorem in plane and application of these theorems.

Prescribed Text Book:

1. "A course of mathematical analysis" by Santhi Narayana and P.K.Mittal, S.Chand publication (Chapter 16 and 17).
2. "Vector Analysis" by Murray R.Spiegel, Schaum series publishing Company (chapters 3, 4, 5, 6 and 7).

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year-VI Semester -VIII (a) Paper (Elective) w.e.f. 2016-17
(EARLIER CBCS)

NUMERICAL ANALYSIS - II

UNIT - I

Curve fitting: Least-squares curve fitting procedures, fitting a straight line, non linear curve fitting, curve fitting by a sum of exponentials.

UNIT - II

Numerical differentiation, errors in numerical differentiation, Maximum and minimum values of a tabulated function, Numerical integration, Trapezoidal rule, Simpson's 1/3-rule, Simpson's 3/8-rule, Boole's and Weddle's rule.

UNIT - III

Linear systems of equations, Solutions of linear systems - Direct methods, Matrix inversion method, Gaussian elimination method, Method of factorization, Iterative methods, Jacobi's method, Gauss-siedal method.

UNIT - IV

Numerical solutions of ordinary differential equations: Introductoin, solution by Taylor's series, Picard's method of successive approximations. Euler's method, Modified Euler's method, Runge-Kutta method, Predictor-corrector methods, Milne's method.

Prescribed Text Book:

Scope as in "Introductory Methods of Numerical Analysis" by S.S.Sastry, Prentice Hall India (4th Edition)

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SYLLABUS FOR MATHEMATICS
B.Sc. III Year-VI Semester-VIII(b) Paper (Elective) w.e.f 2016-17
(EARLIER CBCS)

FOURIER ANALYSIS

UNIT - I

Fourier series, theorem, Dirichlet's conditions. Fourier series for even and odd functions. Half range Fourier series, other forms of Fourier series.

UNIT - II

Dirichlet's conditions, Fourier integral formula (without proof). Fourier transform, Inverse Theorem for Fourier transform. Fourier sine and cosine transforms and their inversion formula. Linearity property of Fourier transform, change of scale property, Shifting theorem, Modulation theorem.

UNIT - III

Convolution theorem of Fourier transforms, Parseval's identity, Finite Fourier cosine transform, Inversion formula for cosine transform.

UNIT - IV

Application of Fourier transform to initial and boundary value problems.

Prescribed Text Book:

1. Scope as in "A course of mathematical analysis" by Santhi Narayana and P.K.Mittal published by S.Chand and company (chapter 10).
2. Scope as in "Integral transform" by A.R.Vasistgha and Dr.K.Gupta published by Krishna Prakashan Media Pvt.Ltd., Meerut.

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