NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
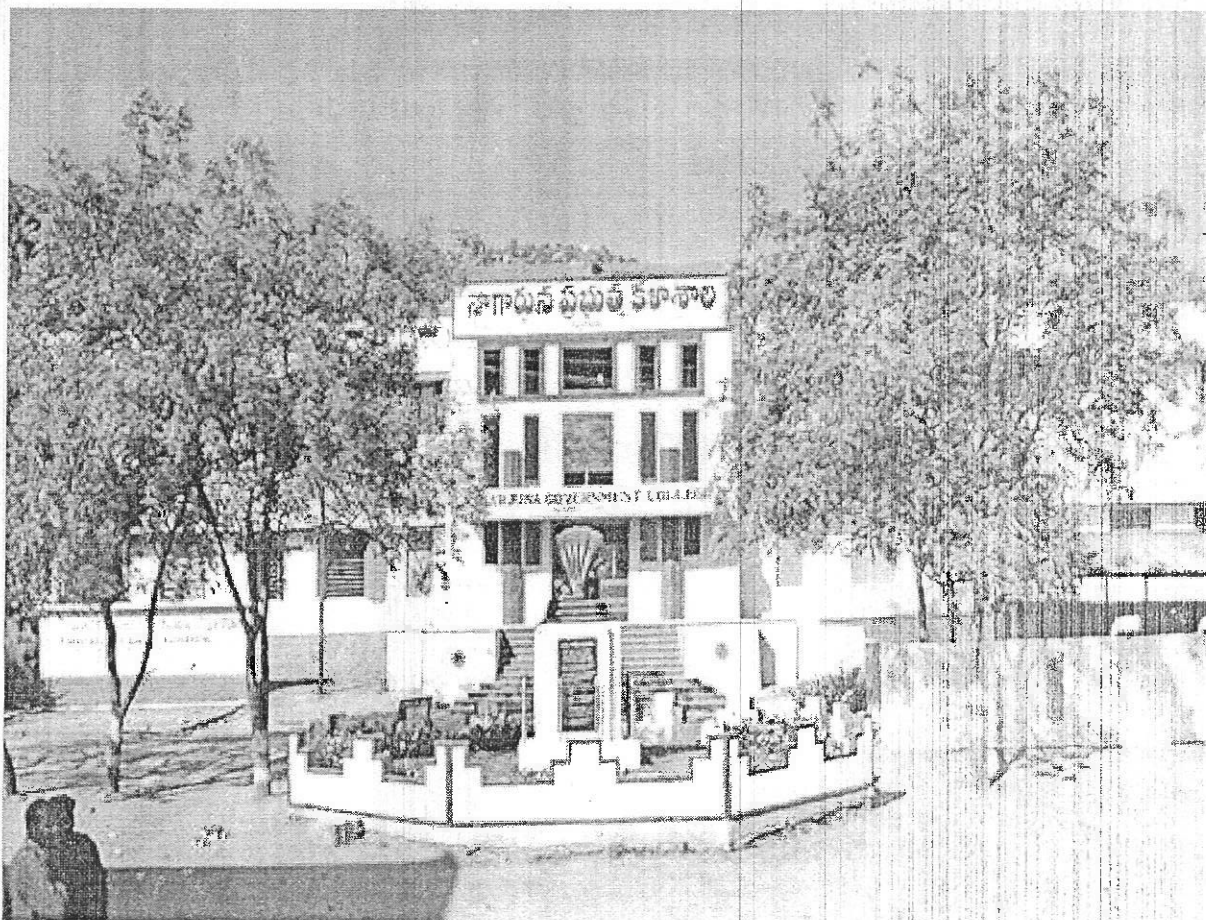(Autonomous) Reaccredited by NAAC with 'A' Grade
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(www.ngcnalgonda.org)

BOARD OF STUDIES 2018-2019

DEPARTMENT OF MATHEMATICS

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

NAGARJUNA GOVERNMENT COLLEGE: NALGONDA
(AUTONOMOUS)
DEPARTMENT OF MATHEMATICS
Constitution of Board of Studies 2018-19

S.NO	CATEGORY	NAME & DESIGNATION
1	Chairman Board of studies	Dr. S. Upender In-Charge Department of Mathematics N. G. College, Nalgonda
2	University Nominee	Sri CH. Venkateshwarlu , Asst. Prof . in Maths , GDC Malkajgiri
3	Subject Expert from out side the college	Sri V. Srinivasa Reddy Associate Prof. of Mathematics, GDC Ramannapet.
4	Subject Expert from out side the college	Dr. V. Yadaiah asst. Prof. of Mathematics , GDC (W) Nalgonda
5	Members: All the Faculty members of the Dept.	1. Sri N. Narsimha Asst. Prof. of Maths 2. Sri D. Madhukar Cont. Lecturer in Maths 3. Sri K. Kanakaiah Cont. Lecturer in Maths 4. Sri S. Mahesh Guest Faculty in Maths 5. Smt C. K. Rajani Guest Faculty in Maths

Submitted by

In-Charge Chairman BOS

Proposals approved by
Principal/Chairman Academic Council

NAGARJUNA GOVERNMENT COLLEGE: NALGONDA
(AUTONOMOUS)
(Re-Accredited by NAAC with A Grade)

To

From
Principal
Nagarjuna Government College
Nalgonda

Sir,

Sub:- Grant of Autonomous status – Constitution of the Board of Studies in Mathematics – request for approval – Reg.

Ref:- 1. No.F.22-1/2007(AC)Date: 03-04-2007.
2.OU Lr.NoMR.69/H/2007/Acad,Date:12-06-2007.
3.GORt.No. 467 HE.(CE-1) Dept. Date: 29-06-2007.
4.MGU Lr.347/MGU/2017-18.Date: 17-08-2017.

With reference to the subject cited, I am pleased to communicate that since our college has Academic Autonomy a Board of Studies (BOS) in Mathematics is formed with the following members for the Academic year 2017-18 and 2018-19.

S.NO	Name	Designation
1	Chairman Board of studies	Dr. S. Upender In-Charge Department of Mathematics N. G. College, Nalgonda
2	University Nominee	Sri CH. Venkateshwarlu , Asst. Prof . in Maths , GDC Malakajgiri
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5	Members: All the Faculty members of the Dept.	1. Sri N. Narsimha Asst. Prof. of Maths 2. Sri D. Madhukar Cont. Lecturer in Maths 3. Sri K. Kanakaiah Cont. Lecturer in Maths 4. Sri S. Mahesh Guest Faculty in Maths 5. Smt C. K. Rajani Guest Faculty in Maths

The term of the office of the members of the Board of studies in Mathematics shall be for a period of two (2) years with effect from the data of issue of this letter. TA and DA will be paid to the outstation members as per the Government rules whenever they attend the meetings of the Board of Studies.

With regards.

Copy to all members.
Copy to concerned principal

Principal

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous, Accredited by NAAC with "A" Grade)

DEPARTMENT OF MATHEMATICS

BOARD OF STUDIES MEETING

The members of Board of Studies in Mathematics Department, N. G. College, Nalgonda met under the chairmanship of Dr S. Upender on 07-09-2018 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 (CBCS) and Cumulative Grade Point Average (CGPA) system for B. Sc I, II & III Year students for the academic year 2018-19.

2. To consider and approve the syllabus for B.Sc. I, II & III years (I, II, III, IV, V & VI Semesters) for the academic year 2018-19.

3. 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 2018-19.

4. To consider and approve the Syllabus of practical examinations at the end of semesters for B.Sc. I, II & III year students.

5. To consider and approve the model question papers for B.Sc. I, II & III year for the academic year 2018-19.

6. To consider approve the Syllabus SEC in IV Semester & V semester

7. To consider and approve the list examiners for paper setting and evaluation for the academic year 2018-19

Any other related academic matters.

RESOLUTIONS
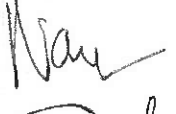
1. The Choice Based Credit System (CBCS) and Cumulative Grade Point Average (CGPA) System can be implemented for the B.Sc. I, II & III Year (I, II, III, IV, V & VI Semesters) students for the academic year 2018-19.

2. Unitization of syllabus into 4 units for each paper (module) and approved the syllabus for B. Sc (Mathematics) I, II years (I, II, III & IV semesters) and 3 units (module) for each paper and approved the syllabus for III year (V & VI semesters) for the academic year 2018-19.

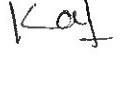3. The evaluation of the students for each semester of I, II, III, IV, V & VI Consists 100 marks in the ratio of 70:30 External End Theory exam – 70 marks and internal exam consist 30 marks. (Internal Assessment 20 marks, Assignment 5 marks and Seminar 5 marks) Two internal exams will be conducted for each semester and best of two will be considered.

4. Approved the syllabus for I, II, III, IV, V, VI, VII & VIII papers and approved the syllabus for Practical Examinations for each semesters for the I, II & III years. The syllabus approved and followed the practical question bank (as for University question bank)

5. Approved the syllabus and model question papers for each semester for the academic year 2018-19.

6. Approved the Syllabus SEC (Theory of equations) in IV Semester & (Laplace Transforms) in V semester for Mathematical stream. Approval the panel of examiners for paper setting and evaluation for the academic year 2018-19.

PANEL OF EXAMINERS (2018-19):

1. Sri V. Srinivas Reddy, Associate Professor of Mathematics, GDC, Ramannapet.
2. Sri P. RamMohan Reddy, Associate Professor of Mathematics, GDC Darpalli, Nizambad.
3. Sri B. Rajender Kumar, Associate Professor of Mathematics, GDC Patanchervu.
4. Dr V. Yadaiah, Asst. Professor of Mathematics, GDC (W), Nalgonda.
5. Dr G. Upender Reddy, Asst. Professor, MGU, Nalgonda.
6. Sri G. Narender Reddy, Asst. Professor of Mathematics, GDC, Hayathnagar
7. Sri B. S. S. P. Rajasekhar, Asst. Professor of Mathematics, GDC (W), Nalgonda.
8. Sri A. Janaiah, Asst. Professor of Mathematics, GDC, Malkajgiri.
9. Sri CH. Venkateshwarlu, Asst. Professor of Mathematics, GDC, Malkajgiri.
10. Sri Saidi Reddy Asst. Professor of Mathematics, KRRGDC, Kodad. 9492185924
11. CH. Narsimha Raju Asst. Professor of Mathematics, GDC, Ramannapet.

7842283974
9182685498

SIGNATURES OF THE MEMBERS.

1. (Dr S. Upender) — Chairman B.O.S.
2. (Ch. Venkateshwarlu) — University nominee
3. (V. Srinivasa Reddy — Subject expert
   7/9/18
4. V. Yadaiah (Dr. V. Yadaiah) — Subject expert
5. (N. Narsimha) — Member
6. (D. Madhukar) — Member
7. Kal (K. Kanakaiah) — Member
8. (S. Mahesh) — Member
9. (C. K. Rajani) — Member

NAGARUJUNA GOVT.COLLEGE (AUTONOMOUS), NALGONDA
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ALLOCATION OF CREDITS AT SUBJECT LEVEL
Course: SCIENCE   Subject: Mathematics

S.No	Semester	Model (Paper)	Hours Per week	Max. Marks	Credits
1	I (Core)	Differential Calculus	4	100	3
2	Practical	Differential Calculus	3	50	2
3	II (Core)	Differential Equations	4	100	3
4	Practical	Differential Equations	3	50	2
5	III (core)	Real Analysis	4	100	3
6	Practical	Real Analysis	3	50	2
7	IV (Core)	Abstract Algebra	4	100	3
8	Practical	Abstract Algebra	3	50	2
9	SEC	Theory of Equations			
10	V (Core)	Linear Algebra	4	100	3
11	Practical	Linear Algebra	3	50	2
12	VI(Elective)	(i) Analytical solid Geometry (ii) Integral calculus	4	100	3
13	Practical	(i) Analytical solid Geometry (ii) Integral calculus	3	50	2
14	SEC	Laplace transforms			
15	VII (Core)	Numerical Analysis	4	100	3
16	Practical	Numerical Analysis	3	50	2
17	VIII (Elective)	(i) Complex Analysis (ii) Vector Calculus	4	100	3
18	Pracrtical	(i) Complex Analysis (ii) Vector Calculus	3	50	2

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous, Accredited by NAAC with "A" Grade)

SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. I Year - I Semester – MODULE – I (w.e.f. 2017-18)

DIFFERENTIAL CALCULUS

15 Hours

Objective: The course is aimed at explosing 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.

15 Hours

UNIT - II

Indeterminate forms – Curvature and Evolutes.

15 Hours

UNIT - III

Partial differentiation – Homogeneous functions – Total derivative

15 Hours

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, Percey 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

(Ch. Venkateshwarlu)

V. Yadaiah

9/9/18

No.	Event	Position	Name	College
12	Prabhodalmaka Geetam (Group)	First	S. Uma Maheshwari & Group	GDC Khairatabad
		Second	S. Rajeev & Group	GDC (A) Nalgonda
13	Folk Song (SOLO)	First	B. Prem Sagar	GDC (A) Khammam
		Second	ASHWINI RATHOD	GDC Khairatabad
14	Folk Song (Group)	First	S. Anvesh & Group	GDC (A) Khammam
		Second	P. Praveen Kumar & Group	Govt City College (A) Nayapul
15	Group Dance (Folk)	First	V. Prashanth & Group	SRR GDC Karimnagar
		Second	P. Sathish	BJR GDC, Narayanaguda
16	Classical Dance (Solo)	First	K. Swathi	GDC (W) Wanaparthy
		Second	T. Gundev	SRR GDC Karimnagar
17	Skit	First	S. Ram Prasad	Giraj GDC (A) Nizambad
		Second	M. Pooja & Group	GDC Malkajgiri
18	Mono Action	First	K. Kiran	NG College, Nalgonda
		Second	Harishma	GDC, Godavarikani
19	Mime	First	K. Manjula & Group	SRR GDC Karimnagar
		Second	N. Naveen Kumar & Group	GDC (A) Mahabubnagar
20	Mimicry	First	B. Madhusudan	Govt City College (A) Nayapul
		Second	K. Rajesh	GDC (A), Siddipet
21	Short Film	First		BJR GDC, Narayanaguda
		Second		GDC, Khairatabad

		Second	G.Prashanth & Group	GDC Kothagudem
5	Elocution TELUGU	First	Md.Akram	GDC (A) Nalgonda
		Second	P.Vaishnavi	GDC (W), Warangal
	Elocution ENGLISH	First	Ushaswini	GDC (W) Nalgonda
		Second	Salwa Maheen	GDC Hussainialam
	Elocution URDU	First	Md.Azeemuddin	GDC (A) Mahabubnagar
		Second	Maleka Alam	GDC (W), Karimnagar
	Elocution HINDI	First	Amith Kumar	GDC (A) Mahabubnagar
		Second	Farhanaz	NG GDC Nalgonda
6	Essay Writing TELUGU	First	V.Veena	GDC (W) Jogipet
		Second	K.Ramanjaneyulu	GDC Hayathnagar
	Essay Writing ENGLISH	First	Javeriya Tarannum	GDC (A) Nalgonda
		Second	Ashriya Amreen	KGDC Warangal
	Essay Writing URDU	First	Shaik Imran	GDC (A) Nizamabad
		Second	Shaik Ayesha	GDC (W) Mahabubnagar
	Essay Writing HINDI	First	Lubna Samreen	GDC (A) Nalgonda
		Second	Pushpalatha	GDC (W) Mahabubnagar

CULTURAL

7	Poster Making	First	S. Neeraja & Ch. Vandana	GDC (W) Karimnagar
		Second	D. Rakesh & D. Chandrashekar	GDC (M) Adilabad
8	Painting	First	M.Rajashekar	SRNK GDC, Banswada
		Second	A. Prahlad	Govt. City College, Nayapool
9	Cartooning	First	Jaya Sree Mishra	GDCW, Begumpet
		Second	Ch. JayaLaxmi	ABVGDC, Jangaon
10	Rangoli	First	M.Ambika & L. Jahnavi	GDC, Sadashivpet
		Second	R. Bhavani & B. Deepika	GDC, Mancherial
11	Prabhodatmaka Geetam (SOLO)	First	P.Sanath	SRR GDC Karimnagar
		Second	T. Pranava Sai Koushik	GDC, Palem

		Place		
		Third Place	A.Umarani	GDC Kodad
6	400 mts Dash – Men	First Place	K.Tirupathi	SR&BGNR GDC, Khammam.
		Second Place	K.Shivanandu	GDC (A) Nalgonda. ✓
		Third Place	K.Krishna	GDC (M) Adilabad.
	400 mts Dash – Women	First Place	S.Sarswathi	GDC (W) Warangal
		Second Place	P.Vijaya	GDC (A) Mahabubanagar.
		Third Place	T.Susmitha	GDC (A) Nizamabad.
7	1500 mts Dash – Men	First Place	G.Vijay kumar	KGDC Warangal
		Second Place	R.Ramesh Chandra	GDC,Amrabad.
		Third Place	J.Mahesh Yadav	GDC (A) Nalgonda ✓
	800 mts Dash – Women	First Place	S.Sarswathi	GDC (W) Warangal
		Second Place	P.Vijaya	GDC (A) Mahabubanagar.
		Third Place	Y.Sravani	GDC Kothagudem
8	Long Jump – Men	First Place	B.Ramesh	KGDC Warangal
		Second Place	M.Upendar	GDC(A) Nalgonda. ✓
		Third Place	T.Ravi	GDC (A) Mahabubnagar.
	Long Jump – Women	First Place	G.Usharani	GDC,Palvoncha
		Second Place	Ch.Swarthi	GDC Devarakonda.
		Third Place	W.Mangala	GDC (W) Adilabad.
9	Shotput – Men	First Place	B.Yaswanth	KGDC Warangal
		Second Place	Sai charan	GDC Medak
		Third Place	G.Omkar	SRAS GDC Kothagudem.
	Shotput – Women	First Place	K.Shivalaxmi	GDC (W) Begumpet
		Second Place	L.Jyothi	BRR GDC Jadcherla
		Third Place	M.Jayalaxmi	GDC (W) Khammam

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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 Muray, Differential Equations
S.Balachandra Rao, Differential Equations with Applications and Programs
Stuart P Hastings, J Bryce McLead; Classical Methods in Ordinary Differential Equations.

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. II Year - III Semester –MODULE III (w.e.f. 2017-18)

REAL ANALYSIS

Objective: The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.

Outcome: After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

UNIT – I

Sequences: Limits of Sequences – A Discussion about Proofs – Limit Theorems for Sequences – Monotone Sequences and Cauchy Sequences.

UNIT - II

Subsequences – Lim sup's and Lim inf's -Series- Alternating Series and Integral Tests

UNIT - III

Sequences and Series of Functions: Power Series – Uniform Convergence-More on Uniform Convergence – Differentiation and Integration of Power Series (Theorems in this section without Proofs)

UNIT - IV

Integration: The Riemann Integral – Properties of Riemann Integral – Fundamental Theorem of Calculus.

Text: Kenneth A Ross, *Elementary Analysis-The theory of Calculus*

References: William F. Trench, *Introduction to Real Analysis*
Lee Larson, *Introduction to Real Analysis I.*

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. II Year - IV Semester –MODULE IV (w.e.f. 2017-18)

Algebra

Objective: The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

Outcome: On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

UNIT – I

Groups: - Definition and Examples of Groups – Elementary Properties of Groups-Finite Groups Subgroups – Terminology and Notation – Subgroups Tests – Examples of Subgroups Cyclic Groups Properties of Cycli Groups – Classification of Subgroups Cyclic Groups – Permutation Groups: Definition and Notation – Cycle Notation – Properties of Permutations – A Cheek Digit Scheme Based on D_5.

UNIT - II

Isomorphisms: Motivation – Definition and Examples – Cayley's Theorem properties of Isomorphisms – Automorphisms – Cosets and Lagrange's Theorem Properties of Cosets 138 – Lagrange's Theorem and Consequences – An Application of Cosets to Permutation Groups – The Rotation Group of a Cube and a Soccer Ball – Normal Subgroups and Factor Groups ; Normal subgroups – factor groups applications of factor Groups – Groups Homeomorphisms-Definition and Examples – Properties of Homomorphism's – The First Isomorphism Theorem.

UNIT - III

Introduction to rings: motivation and Difinition – Examples of Rings – Properties of Rings – Subrings – Integral Domains; Definition and Examples – Characteristics of a Ring – Ideals and Factor Rings: ideals-Factor Rings – Prime Ideals and Maximal Ideals.

UNIT – IV

Ring Homomorphism's: Definition and Examples – Properties of Ring-Homomorphism's-The Field of Quotients Polynomial Rings: Notation and Terminology.

Text: Joseph A Gallian, Contemporary Abstract algebra (9th edition)

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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. II Year - IV Semester –SEC (w.e.f. 2017-18)

Theory of Equations

Unit I

Graphic representation of a polynomial-Maxima and minima values of polynomialsTheorems relating to the real roots of equations-Existence of a root in the general equation –Imaginary roots-Theorem determining the number of roots of an equationEqual roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots
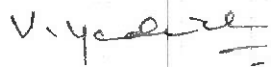
Unit II

Relations between the roots and coefficients-Theorem-Applications of the theoremDepression of an equation when a relation exists between two of its roots-The cube roots of unity-Symmetric functions of the roots-examples.

Text: 1. W.S. Burnside and A.W. Panton, The Theory of Equations

References: 1. C. C. Mac Duffee, Theory of Equations

2. Hall and Knight, Higher Algebra

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. III Year - V Semester –MODULE V (w.e.f. 2018-19)

LINEAR ALGEBRA

Objective: The students are exposed to various concepts like vector spaces , bases , dimension, Eigen values etc .

Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit I

Vector Spaces : Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit II

Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit III

Diagonalization -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations -Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets

Text : David C Lay , Linear Algebra and its Applications 4e

References: S Lang, Introduction to Linear Algebra

Gilbert Strang, Linear Algebra and its Applications

Stephen H Friedberg et al, Linear Algebra

Kuldeep Singh, Linear Algebra

Sheldon Axler, Linear Algebra Done Right

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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SYLLABUS FOR MATHEMATICS (NEW CBCS)

B.Sc. III Year - IV Semester –MODULE VI (A) (Elective) (w.e.f. 2018-19)

ANALYTICAL SOLID GEOMETRY

Objective: Students learn to describe some of the surfaces by using analytical geometry.

Outcome: Students understand the beautiful interplay between algebra and geometry.

Unit I

Sphere: Definition-The Sphere Through Four Given Points-Equations of a CircleIntersection of a Sphere and a Line-Equation of a Tangent Plane-Angle of Intersection of Two Spheres-Radical Plane

Unit II

Cones and Cylinders: Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex –Intersection of a Line with a Cone- The Right Circular Cone-The Cylinder- The Right Circular Cylinder
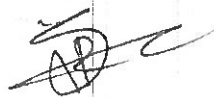
Unit III

The Conicoid: The General Equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder

Text : Shanti Narayan and P K Mittal , Analytical Solid Geometry (17e)

References: Khaleel Ahmed , Analytical Solid Geometry

S L Loney, Solid Geometry Smith and Minton, Calculus

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA
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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. III Year - V Semester –MODULE VI (B) (Elective) (w.e.f. 2018-19)

INTEGRAL CALCULUS

Objective: Techniques of multiple integrals will be taught.

Outcome: Students will come to know about its applications in finding areas and volumes of some solids.

Unit I

Areas and Volumes: Double Integrals-Double Integrals over a Rectangle-Double Integrals over General Regions in the Plane-Changing the order of Integration

Unit II

Triple Integrals: The Integrals over a Box- Elementary Regions in Space-Triple Integrals in General

Unit III

Change of Variables: Coordinate Transformations-Change of Variables in Triple Integrals

Text: Susan Jane Colley, Vector Calculus(4e)

References: Smith and Minton , Calculus Shanti Narayan and Mittal, Integral calculus Ulrich L. Rohde , G. C. Jain , Ajay K. Poddar and A. K. Ghosh. Introduction to Integral Calculus

Laplace Transforms

Unit I

Laplace transforms Definition of Integral Transform - Definition of Laplace transform - linearity propertyPiecewise continuous functions - 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 - Initial value theorem – Final value theorem - Laplace transform of integrals - Multiplication by powers of t - Division by t – Evaluation of Integrals - Laplace transform of periodic functions and some special functions.

Unit-II

Inverse Laplace transforms Definition of Inverse Laplace transform – Definition of Null function - Linearity property - First and second shifting theorems of inverse Laplace transform. Change of scale property – Inverse Laplace transform of derivatives - Inverse Laplace transform of Integrals – Multiplication by powers of p - Division by powers of p – Definition of Convolution – convolution theorem - Heaviside's expansion theorem or formula and applications – The Beta function.

Prescribed text Book:

Scope as in Integral transforms by A.R. Vasishtha & Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut. Chapter I, Chapter II: All sections except 2.3 and 2.18

Reference Book: Operational Mathematics by R.V.Churchil, McGraw Hill Company

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous, Accredited by NAAC with "A" Grade)
<u>SYLLABUS FOR MATHEMATICS (NEW CBCS)</u>
<u>B.Sc. III Year - VI Semester – MODULE VII (w.e.f. 2018-19)</u>

NUMERICAL ANALYSIS

Objective: Students will be made to understand some methods of numerical analysis.
Outcome: Students realize the importance of the subject in solving some problems of algebra and calculus.

Unit – I

Solutions of Equations in One Variable : The Bisection Method - Fixed-Point Iteration - Newton's Method and Its Extensions - Error Analysis for Iterative Methods - Accelerating Convergence - Zeros of Polynomials and Müller's Method - Survey of Methods and Software

Unit – II

Interpolation and Polynomial Approximation: Interpolation and the Lagrange Polynomial - Data Approximation and Neville's Method - Divided Differences - Hermite Interpolation - Cubic Spline Interpolation
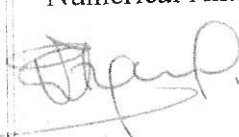
Unit – III

Numerical Differentiation and Integration: Numerical Differentiation - Richardson's Extrapolation - Elements of Numerical Integration- Composite Numerical Integration - Romberg Integration - Adaptive Quadrature Methods - Gaussian Quadrature
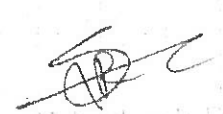
Text : Richard L. Burden and J. Douglas Faires, Numerical Analysis (9e)

References: M K Jain, S R K Iyengar and R k Jain, Numerical Methods for Scientific and Engineering computation B.Bradie, A Friendly introduction to Numerical Analysis

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

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SYLLABUS FOR MATHEMATICS (NEW CBCS)

B.Sc. III Year - VI Semester –MODULE VIII (A) (Elective) (w.e.f. 2018-19)

COMPLEX ANALYSIS

Objective: Analytic Functions, contour integration and calculus of residues will be introduced to the students.

Outcome: Students realize calculus of residues is one of the power tools in solvng some problems, like improper and definite integrals, effortlessly.

Unit – I

Regions in the Complex Plane - Analytic Functions - Functions of a Complex Variable - Mappings - Mappings by the Exponential Function - Limits - Theorems on Limits - Limits Involving the Point at Infinity - Continuity - Derivatives - Differentiation Formulas - Cauchy–Riemann Equations - Sufficient Conditions for Differentiability - Polar Coordinates-Harmonic Functions Elementary Functions: The Exponential Function - The Logarithmic Function - Branches and Derivatives of Logarithms - Some Identities Involving Logarithms Complex Exponents - Trigonometric Functions - Hyperbolic Functions

Unit – II

Integrals: Derivatives of Functions w(t) - Definite Integrals of Functions w(t) - Contours - Contour Integrals - Some Examples - Examples with Branch Cuts - Upper Bounds for Moduli of Contour Integrals -Antiderivatives

Unit – III

Cauchy–Goursat Theorem - Proof of the Theorem - Simply Connected Domains - Multiply Connected Domains - Cauchy Integral Formula - An Extension of the Cauchy Integral Formula - Some Consequences of the Extension - Liouville's Theorem and the Fundamental Theorem of Algebra- Maximum Modulus Principle Page 52

Text: James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (8e)

References: Joseph Bak and Donald J Newman, Complex analysis

Lars V Ahlfors, Complex Analysis

S.Lang, Complex Analysis

B Choudary, The Elements Complex Analysis

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SYLLABUS FOR MATHEMATICS (NEW CBCS)
B.Sc. III Year - VI Semester –MODULE VIII (B) (Elective) (w.e.f. 2018-19)

VECTOR CALCULUS

Objective: Concepts like gradient, divergence, curl and their physical relevance will be taught.

Outcome: Students realize the way vector calculus is used to addresses some of the problems of physics.

Unit I

Line Integrals: Introductory Example : Work done against a Force-Evaluation of Line Integrals Conservative Vector Fields-Surface Integrals: Introductory Example : Flow Through a Pipe Evaluation of Surface Integrals
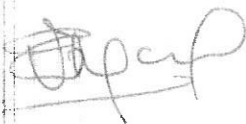
Unit II

Volume Integrals: Evaluation of Volume integrals Gradient, Divergence and Curl: Partial differentiation and Taylor series-Partial differentiation Taylor series in more than one variable-Gradient of a scalar field-Gradients, conservative fields and potentials-Physical applications of the gradient

Unit III

Divergence of a vector field -Physical interpretation of divergence-Laplacian of a scalar field Curl of a vector field-Physical interpretation of curl-Relation between curl and rotation-Curl and conservative vector fields.

Text: P.C. Matthews, Vector Calculus.
References: G.B. Thomas and R.L. Finney, Calculus H. Anton, I. Bivens and S. Davis, Calculu

Faculty of Science
B.Sc I/II/III/IV Semester Examination
MATHEMATICS MODEL PAPER (CBCS)

Time: 2 ½ Hrs   Max.Marks: 70

SECTION – A   (5 X 2 = 10)

Answer the following questions :(At least one question from each section)

1.
2.
3.
4.
5.

SECTION – B   (4 X 5 =20)

Answer any **FOUR** of the following questions :(At least one question from each section)

6.
7.
8.
9.
10.
11.

SECTION – C   (4 X 10 = 40)

Answer the following questions

12   (a)   Unit – I

                (OR)

    (b)   Unit – I

13   (a)   Unit – II

                (OR)

    (b)   Unit – II

14   (a)   Unit – III

                (OR)

    (b)   Unit – III

15   (a)   Unit – IV

                (OR)

    (b)   Unit – IV

Faculty of Science
B. Sc V/VI Semester Examination
MATHEMATICS MODEL PAPER (CBCS)

Time : 2 ½ Hrs   Max.Marks : 70

SECTION – A   (5 X 2 = 10)

Answer the following questions :(At least one question from each section)

1.

2.

3.

4.

5.

6.

SECTION – B   (4 X 6 =24)

Answer any **FOUR** of the following questions :(At least one question from each section)

7.

8.

9.

10.

11.

12.

SECTION – C   (3 X 12 = 36)

Answer the following questions

13   (a)   Unit – I

                (OR)

      (b)   Unit – I

14   (a)   Unit – II

                (OR)

      (b)   Unit – II

15   (a)   Unit – III

                (OR)

      (b)   Unit – III