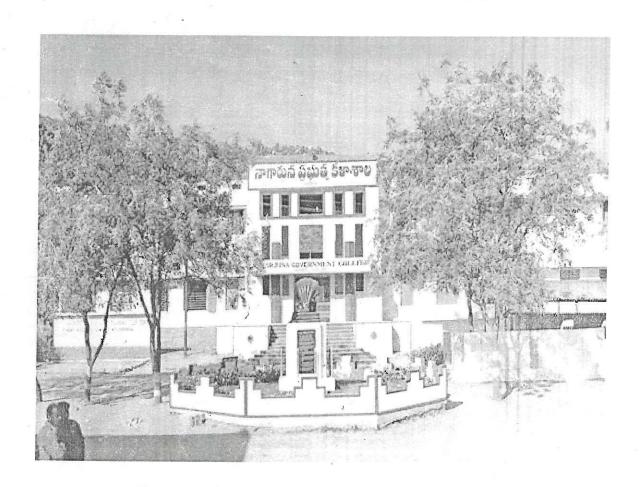
### NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

(Autonomous) Reaccredited by NAAC with 'A' Grade
(Affiliated to Mahatma Gandhi University)
(www.ngcnalgonda.org)

### **BOARD OF STUDIES 2019-2020**



### DEPARTMENT OF MATHEMATICS

NAGARJUNA GOVERNMENT COLLEGE, NALGONDA

### 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 25-10-2019 at Department of Mathematics, Nagarjuna Government College(A), discussed the following agenda and passed the resolutions.

### **AGENDA**

- 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 2019-20.
- 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 2019-20.
- 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 2019-20.
- 4. To consider and approve the Syllabus of practical examinations at the end of semesters for B.Sc. II & III year students.
- 5. To consider and approve the model question papers for B.Sc. I, II & III year for the academic year 2019-20.
- 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 2019-20.

Any other related academic matters.

### RESOLUTIONS

- 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 2019-20.
- 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 2019-20.
- 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 II & III years. The syllabus approved and followed the practical question bank.
- 5. Approved the syllabus and model question papers for each semester for the academic year 2019-20.
- 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 2019-20.

### PANEL OF EXAMINERS (2019-20):

- 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 of Mathematics, 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.
- 11. CH. Narsimha Raju Asst. Professor of Mathematics, GDC, Ramannapet.

### SIGNATURES OF THE MEMBERS.

(V. Snini Versa Radoly)

## NAGARUJUNA GOVT.COLLEGE (AUTONOMOUS), NALGONDA (Reaccredited by NAAC with "A" Grade)

### 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 and Integral Calculus	6 (Theory 5 Hr/W + Tutorial 1 Hr/W)	100	5
2	II (Core)	Differential Equations	6 (Theory 5 Hr/W + Tutorial   Hr/W)	100	5
3	III (core)	Real Analysis	4	100	3
4	Practical	Real Analysis	3	50	2
5	IV (Core)	Abstract Algebra	4	100	3
6	Practical	Abstract Algebra	3	50	2
7	SEC	Theory of Equations	2	50	2
8	V (Core)	Linear Algebra	4	100	3
9	Practical	Linear Algebra	3	50	2
10	VI(Elective)	(i) Analytical solid Geometry (ii) Integral calculus	4	100	3
11	Practical	(i) Analytical solid Geometry (ii) Integral calculus	3	50	2
12	SEC	Laplace transforms	2	50	2
13	VII (Core)	Numerical Analysis	4	100	3
14	Practical	Numerical Analysis	3	50	2
15	VIII (Elective)	(i) Complex Analysis (ii) Vector Calculus	4	100	3
16	Practical	(i) Complex Analysis (ii) Vector Calculus	3	50	2

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## 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. 2019-20)

### DIFFERENTIAL and INTEGRAL CALCULUS

**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

Partial Differentiation: Introduction - Functions of two variables - Neighbourhood of a point (a,b) -Continuity of a Functions of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two variables - Homogeneous Functions.

### UNIT - II

Theorem on Total Differentials – Composite Functions – Differentiation of Composite Functions – Implicit functions – Equality of  $f_{xy}(a, b)$  and  $f_{yx}(a, b)$  – Taylor's theorem for a function of two variables – Maxima and Minima of functions of two variables – Lagrange's method of undetermined Multipliers.

### UNIT - II

Curvature and Evolutes: Introduction – Definition of Curvature – Radius of Curvature – Length of Arc as a function, Derivative of arc – Radius of Curvature – Cartesian Equations – Newtonian Method – Centre of Curvature – Chord of Curvature

Evolutes: Evolutes and Involutes – Properties of the Evolute.

**Envelopes:** One Parameter Family of Curves – Consider the family of straight lines – Definition – Determination of Envelope.

### UNIT - IV

**Lengths of Plane Curves:** Introduction – Expression for the lengths of curves y = f(x) – Expressions for the lengths of arcs x = f(y); x = f(t),  $y = \phi(t)$ ;  $t = f(\theta)$ 

Volumes and Surfaces of Revolution: Introduction — Expression for the volume obtained by revolving about either axis — Expression for the volume obtained by revolving about any line — Area of the Surface of the frustum of a cone — Expression for the surface of revolution — Pappus theorems — Surface of Revolution.

Text: Shanti Narayan and Mittal, Differential Calculus

Shanti Narayan, Integral 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

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# NAGARJUNA GOVERNMENT COLLEGE, NALGONDA (Autonomous, Accredited by NAAC with "A" Grade) SYLLABUS FOR MATHEMATICS (NEW CBCS) B.Sc. I Year - II Semester – MODULE II (w.e.f. 2019-20)

### 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: Introduction – Equations in which Variables are Separable - Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form – Linear Differential Equations - Differential Equations Reducible to Linear Form - Exact Differential equations - Integrating Factors – Change in Variables – Total Differential Equations - Simultaneous Total Differential Equations – Equations of the form  $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ 

### UNIT - II

Differential Equations first order but not of 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. Applications of First Order Differential Equations: Growth and Decay – Dynamics of Tumour Growth – Radioactivity and Carbon Dating - Compound Interest – Orthogonal Trajectories.

### UNIT - III

**Higher order Linear Differential Equations:** Solution of homogeneous linear differential equations with constant coefficients-Solution of non-homogeneous differential equations P(D) = Q(x) with constant coefficients by means of polynomial operators when  $Q(x) = be^{ax}$ , bsinax/bcosax, bx<sup>k</sup>, Ve<sup>ax</sup>

### UNIT – IV

Method of variation of parameters – Linear differential equations with non constant coefficients – The Cauchy – Euler Equation – Legendre's Linear Equations – Miscellaneous Differential Equations.

**Partial Differential Equations:** Formation and solution – Equations easily integrable – Linear equations of first order.

Text: 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.

Mary Solly 1.0/19 Williams Solly

### NAGARJUNA GOVERNMENT COLLEGE, NALGONDA (Autonomous, Accredited by NAAC with "A" Grade) SYLLABUS FOR MATHEMATICS (NEW CBCS) B.Sc. II Year - III Semester - MODULE III (w.e.f. 2018-19)

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

### 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 Cyclic Groups - Classification of Subgroups Cyclic Groups - Permutation Groups: Definition and Notation - Cycle Notation - Properties of Permutations - A Cheek Digit Scheme Based on D<sub>5</sub>.

### 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 Definition – 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 (9<sup>th</sup> edition)

References: Bhattacharya, P.B Jain, S.K ;and Nagpaul, S.R , Basic Abstract Algebra

Fraleigh, J.B, A First Course In Abstract Algebra

Herstein, I.N, Topics In Algebra

Robert B.Ash, Basic Abstract Algebra

I Martin Isaacs, Finite Group Theory

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# NAGARJUNA GOVERNMENT COLLEGE, NALGONDA (Autonomous, Accredited by NAAC with "A" Grade) SYLLABUS FOR MATHEMATICS (NEW CBCS) B.Sc. II Year - IV Semester – SEC (w.e.f. 2018-19)

### **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

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

# NAGARJUNA GOVERNMENT COLLEGE, NALGONDA (Autonomous, Accredited by NAAC with "A" Grade) SYLLABUS FOR MATHEMATICS (NEW CBCS) B.Sc. III Year - V Semester –SEC (w.e.f. 2018-19)

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

### **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 (Autonomous, Accredited by NAAC with "A" Grade) 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 solving 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

## NAGARJUNA GOVERNMENT COLLEGE, NALGONDA (Autonomous, Accredited by NAAC with "A" Grade) 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	1/2	Hrs

Max.Marks: 70

			$\underline{SECTION - A} \qquad (5 \times 2 = 10)$
Ansv	wer the	following anes	stions:( At least one question from each section)
1.	WOI III	rono ming que:	A Tre least one question from each section)
2.			
3.			
4.			
5.			
			$\underline{SECTION - B} \qquad (4 \times 5 = 20)$
Ansv	ver any	FOUR of the	following questions: (At least one question from each section)
6.			
7.			
8.			
9.			
10. 11.		•	
11,			
	- 18		$\underline{SECTION - C} \qquad (4 \times 10 = 40)$
Ansv	ver the f	following quest	tions
		ono amb daco	
12	(a)	Unit – I	
			(OR)
	(b)	Unit – I	
10		* * *. **	
13	(a)	Unit – II	(OD)
	(b)	Unit – II	(OR)
	(0)	Onn – n	
14	(a)	Unit – III	
	. ,		(OR)
	(b)	Unit - III	
15	(a)	Unit – IV	MICHAEL
	<i>(</i> 1.)	77 % TT7	(OR)
	(b)	Unit – IV	
	*	- lind (	
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## Faculty of Science B. Sc V/VI Semester Examination MATHEMATICS MODEL PAPER (CBCS)

Time: 2 1/2 Hrs

Max.Marks: 70

			$\underline{SECTION - A} \qquad (5 X 2 = 10)$		
Answer the following questions: (At least one question from each section)					
1.					
2. 3.					
4.					
5.			$SECTION - B \qquad (4 \times 6 = 24)$		
	er any	FOUR of the foll	lowing questions: (At least one question from each section)		
6. 7.	#0				
8.					
9. 10.					
11.					
			SECTION – C $(3 \times 12 = 36)$		
			SECTION - C (3 X 12 - 30)		
Answ	er the	following question	ns ·		
12	(a)	Unit – I	•		
	(b)	Unit – I	(OR)		
	(0)	Omt 1			
13	(a)	Unit – II	(OD)		
	(b)	Unit – II	(OR)		
14	(a)	Unit – III	(OR)		
	(b)	Unit – III	(0.1)		
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## NAGARJUNA GOVERNMENT COLLEGE: NALGONDA (AUTONOMOUS)

(Re-Accredited by NAAC with A Grade)

To
Dr G.Upender Reddy
Asst. Prof. of Mathematics
MGU, Nalgonda

From
Principal
NG College
Nalgonda

Lt.NO. Spl /NGC/MATHS/BOS/2019-20, Date: 25-10-2019

Sir,

Sub:- Board of studies meeting – framing of syllabus for the Academic year 2019-20-Reg.

With reference to the subject cited, I request you to kindly make it convenient to attend the meeting of BOS of Department of Maths, NG College, Nalgonda on 25-10-2019 to Discuss the framing of syllabus for I to VI semesters of B.Sc., (Mathematics) preparation and approval of model question papers, preparation of panel of examiners list and other related academic matters.

Thanking you.

Yours faithfully

Nagarjuna Govt. College
(Autonomous) NAEGONDA

## NAGARJUNA GOVERNMENT COLLEGE: NALGONDA (AUTONOMOUS)

(Re-Accredited by NAAC with A Grade)

To

From

Sri V Srinivas Reddy

Principal

Associate. Prof. of Mathematics

NG College

GDC Ramannapet

Nalgonda

Lt.NO. Spl /NGC/MATHS/BOS/2019-20, Date: 25-10-2019

Sir,

**Sub:-** Board of studies meeting – framing of syllabus for the Academic year 2019-20-Reg.

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Thanking you.

Yours faithfully

Principal

Nagarjuna Govt. College

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

To Dr V Yadaiah Asst. Prof. of Mathematics GDC(W), Nalgonda From
Principal
NG College
Nalgonda

Lt.NO. Spi /NGC/MATHS/BOS/2019-20, Date: 25-10-2019

Sir,

Sub:- Board of studies meeting – framing of syllabus for the Academic year 2019-20-Reg.

With reference to the subject cited, I request you to kindly make it convenient to attend the meeting of BOS of Department of Maths, NG College, Nalgonda on 25-10-2019 to Discuss the framing of syllabus for I to VI semesters of B.Sc., (Mathematics) preparation and approval of model question papers, preparation of panel of examiners list and other related academic matters.

Thanking you.

Yours faithfully

Principalcipal

Nagariuna GOVR. Chica

### NAGARJUNA GOVERNMENT COLLEGE: NALGONDA (AUTONOMOUS)

### **DEPARTMENT OF MATHEMATICS** Constitution of Board of Studies 2019-20

S.NO	CATEGORY	NAME & DESIGNATION	
1	Chairman Board of	Dr. S. Upender In-Charge Department of	
	studies	Mathematics N. G. College, Nalgonda	
2	University Nominee	Dr G. Upender Reddy, Asst. Prof. of	
		Mathematics, MGU, Nalgonda	
3	Subject Expert from	Sri V. Srinivasa Reddy Associate Prof. of	
	out side the college	Mathematics, GDC Ramannapet.	
4	Subject Expert from	Dr. V. Yadaiah, Asst. Prof. of Mathematics	
2	out side the college	GDC (W) Nalgonda	
	1,	1. Sri N. Narsimha	
	u s	Asst. Prof. of Maths	
		2. Sri D. Madhukar	
	Members: All the	Cont. Lecturer in Maths	
5	Faculty members of	3. Sri K. Kanakaiah	
80	the Dept.	Cont. Lecturer in Maths	
:		4. Sri M. 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 Govt. College
(Autonomous) NALGONDA

## 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 2019-20.

S.NO	Name	Designation		
1	Chairman Daniel of studios	Dr. S. Upender In-Charge Department of		
_	Chairman Board of studies	Mathematics N. G. College, Nalgonda		
2	Liniversity Naminee	Dr G. Upender Reddy, Asst. Prof. of		
5	University Nominee	Mathematics, MGU, Nalgonda		
3	Subject Expert from out side the	Sri V. Srinivasa Reddy Associate Prof. of		
	college	Mathematics, GDC Ramannapet		
4	Subject Expert from out side the	Dr. V. Yadaiah, Asst. Prof. of		
w w	college	Mathematics, GDC (W) Nalgonda		
		1. Sri N. Narsimha		
		Asst. Prof. of Maths		
		2. Sri D. Madhukar		
		Cont. Lecturer in Maths		
5	Members: All the Faculty	3. Sri K. Kanakaiah		
	members of the Dept.	Cont. Lecturer in Maths		
		4. Sri M. 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 Govt. College (Autonomous) NALGONDA.

### NAGARJUNA GOVERNMENT COLLEGE: NALGONDA (AUTONOMOUS)

No:

/BOS/Maths/Acad/2019-20

DATE: 25-10-2019

To

K. Chandrashekar Principal Nagarjuna Government College (A)

SUB: Nagarjuna Govt. College, Nalgonda (Autonomous) – convening the meeting of Board of Studies – Mathematics on 25-10-19 - Intimation – Request – Reg.

Sir,

Nalgonda

I am happy to inform that you have been nominated as university Nominee of Board of Studies in the Department of Mathematics of this college for the year 2018-19.

The meeting of the Board of studies, Mathematics will be held on 25-10-19 in the Department of Mathematics to consider the following Agenda.

- 1. To approve the syllabus and model question papers for I, II, III, IV, V & VI Semesters.
- 2. To approve the Introduction of Skill Enhancement Compulsory course (SEC) in the I, II, III, IV, V & VI Semesters.
- 3. To approve the Internal assessment.
- 4. To approve the list of examinations for paper setting and evaluation.
- 5. Any other matter with permission of the chair.

You are requested to make it convenient to attend the meeting and extend your cooperation.

In charge/Chairman BOS
Department of Mathematics

Principal

Nagariuna Govi. College (Autonomous) NAEGONDA.