

GOVERNMENT DEGREE COLLEGE FOR WOMEN

AUTONOMOUS

BEGUMPET, HYDERABAD

Reaccredited with "B" Grade by NAAC



DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS COURSE STRUCTURE AND SYLLABUS

(w.e.f. the Academic Year 2019-2020)

CHOICE BASED CREDIT SYSTEM

2021-2022

**GOVERNMENT DEGREE COLLEGE FOR WOMEN
AUTONOMOUS**

BEGUMPET, HYDERABAD

Composition of the Board of Studies

Board of Studies Meeting for the Year 2021-2022: The Board of Studies meeting for Mathematics is held on 04-10-2021.

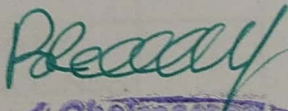
1.	One expert to be nominated by the Vice-Chancellor from a panel of six recommended by the principal	Dr. B.Surender Reddy University Nominee BoS Chair person, Dept. of Mathematics Osmania University Hyderabad.	
2.	Head of the Department Concerned (Chairman)	Dr. S. Prasanna Rani In-charge of Dept. of Mathematics Chairman, Board of Studies GDCW(A), Begumpet, Hyderabad.	
3.	The Entire Faculty of each Specialization	<ul style="list-style-type: none"> • Dr. D. Pushpa Assistant Professor of Mathematics, GDCW(A), Begumpet, Hyderabad. • Dr. D. Sarada Devi Associate Professor of Mathematics GDCW(A), Begumpet, Hyderabad. • Sri K. Koteswar Rao Lecturer in Mathematics GDCW(A), Begumpet, Hyderabad. 	
4.	Two subject experts from outside Parent University to be nominated by Academic Council	<ul style="list-style-type: none"> • Dr. V.Srinivas Associate Professor Department of Mathematics GDC, Peddapally. • Dr.Komuraiah Associate Professor of Mathematics SRR GDC, Karimnagar. 	
5.	One representative from Alumnus	S. Mamatha (BSc at GDCW, Begumpet & MSc at Kerala Central University) Lecturer in Mathematics IPGDC(W), Nampally, Hyderabad.	
6.	One representative from industry/corporate sector /allied area relating to placement.	N. Kishan Reddy, Chairman Sri Venkateshwara Pipes Ltd. & Bhagyanagar Wood Plast Ltd. Hyderabad.	

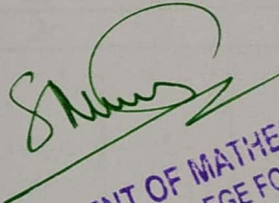
Sri. KPR Industries (Pipes) Ltd.

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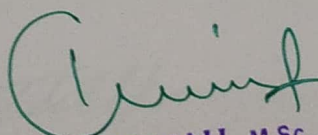
AGENDA FOR THE BOARD OF STUDIES MEETING

1. Approval of the syllabus for I, II, III, IV, V and VI semesters of B.Sc., I, II and III years as per CBCS (Choice Based Credit System) recommended by the State Council of Higher Education.
2. Approval of the paper Numerical Analysis/Study Project for VI Semester of B.Sc., III year as per CBCS (Choice Based Credit System) for 2019-2022 batch .
3. Approval of the Study Project for VI Semester of B.Sc., III year as per CBCS (Choice Based Credit System) for 2020-2023& 2021-2024 batches.
4. Approval of Skill Enhancement Courses for III and IV semesters of B.Sc., II year as per CBCS (Choice Based Credit System) recommended by the State Council of Higher Education.
5. Approval of Generic Elective for Semester V (Inter disciplinary course) for B.Sc., III year.
6. Approval of Scheme of Evaluation-Examination pattern to be followed for all semesters.
7. Approval of scheme of Evaluation of study project.
8. Approval of list of Panel of examiners.
9. Approval of certificate courses.


Chairperson
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

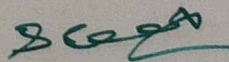

DEPARTMENT OF MATHEMATICS
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BE.3UMPET, HYDERABAD-500016

Sign. of BoS:


E. KOMURIAH, M.Sc., NET
Asst. Prof. of Mathematics
SRR Govt. Arts & Science College
KARIMNAGAR

D. Sarada devi

S. Manalthe



K. Koteswary Rao

Pushpa

**GOVERNMENT DEGREE COLLEGE FOR WOMEN
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ALLOCATION OF CREDITS FOR UNDER GRADUATE COURSE OF B.Sc.
(ACADEMIC YEAR 2019 ONWARDS)**

Allocation of credits for B.A/B.Com/B.Sc from 2019 onwards								
S.No.	Subject	Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6	Total
1	English	4	4	3	3	3	3	20
2	II Language	4	4	3	3	3	3	20
3	AECC	2	2					4
4	SEC			2	2			4
5	SEC			2	2			4
6	Generic Elective / Project	-	-	-	-	4	4	8
7	DSC/DSE	5	5	5	5	5	5	30
8	DSC/DSE	5	5	5	5	5	5	30
9	DSC/DSE	5	5	5	5	5	5	30
	Total	25	25	25	25	25	25	150
10	TSKC *					2	2	4
11	Extra Curricular Activities(NCC/NSS/ Sports/Martial Arts/Yoga & Meditation) *		1		1		1	3

NOTE: * Not included in SGPA/CGPA

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GOVERNMENT DEGREE COLLEGE FOR WOMEN
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D. Sarada Devi

Asst. Prof. of Mathematics
Govt. Arts & Science College
KARIMNAGAR

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B.Sc., MATHEMATICS, COURSE STRUCTURE, 2021-2022

CHOICE BASED CREDIT SYSTEM

PAPER	SEMESTER	TITLE OF THE PAPER	HOURS PER WEEK	THEORY HOURS PER WEEK	TUTORIAL HOURS PER WEEK	MAX. MARKS	CRIDITS
DSC-I	I	DIFFERENTIAL AND INTEGRAL CALCULUS	6	5	1	100	5
DSC-II	II	DIFFERENTIAL EQUATIONS	6	5	1	100	5
DSC-III	III	REAL ANALYSIS	6	5	1	100	5
DSC-IV	IV	ALGEBRA	6	5	1	100	5
DSC-V	V	LINEAR ALGEBRA	6	5	1	100	5
DSE-VI(A) DSE-VI(B)	VI	VI(A) INTEGRAL TRANSFORMS / VI(B) ANALYTICAL SOLID GEOMETRY	6	5	1	100	5
OPTIONAL /PROJECT	VI	NUMERICAL ANALYSIS/ STUDY PROJECT	4	4	0	100	4
SEC-I (UGC SPECIFIED COURSE)	III	COMMUNICATION SKILLS/ PROFESSIONAL SKILLS	2	2	0	50	2
SEC-II	III	THEORY OF EQUATIONS / LOGIC & SETS	2	2	0	50	2
SEC-III (UGC SPECIFIED COURSE)	IV	LEADERSHIP & MANAGEMENT SKILLS / UNIVERSAL HUMAN VALUES	2	2	0	50	2
SEC-IV	IV	NUMBER THEORY / VECTOR CALCULUS	2	2	0	50	2
GENERIC ELECTIVE	V	BASIC MATHEMATICS	4	4	0	100	4

*Tutorial: Problems solving session for each 20 students one batch.

Sign. of BoS:

Prasad
 Chairman
 BoS in Mathematics
 Department of Mathematics
 Osmania University
 Hyderabad-500 007.

Prasad
 DEPARTMENT OF
 UGT Degree College (Autonomous)
 ML JUMPET, HYDERABAD-500018

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Pattern of examination

Internal and Semester evaluation pattern for all the semesters of B.Sc., I, II and III years is given here under

Internal Assessment

- a)
- Two internals of 20 marks each. Average of the two internals is considered for computation of internal marks. Internal exam at the end of every two units.
 - Average of 10 marks for unit-wise MCQs exams each of 10 marks.
 - 5 marks for seminar.
 - 5 marks for assignment.
- b) The duration for the internal shall be 45 minutes.
- c) Internal exam consists of 20 marks.

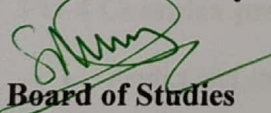
In Section-A, two Short Answer Questions of 5 marks to be answered out of 4 (2X5=10M).
In Section-B, one question has to be answered with internal choice and carries 10 marks.

Semester Examination

60 marks are allotted for each paper per semester. (Pass marks: 24)

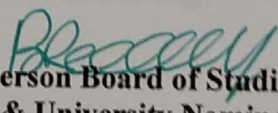
- a. Section -A: 5 questions out of 8 questions have to be attempted -each question carries 4 marks 5X4M = 20M.
- b. Section-B: 4 questions with internal choice have to be attempted -each question carries 10 marks 4X10M=40M.


Resolved to accept the above pattern of examination for I, II semesters of BSc I year, III, IV semesters of BSc II year and V, VI semesters of BSc III year.


**Board of Studies
Chairman**

**GDCW, Begumpet
Hyderabad**

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BEGUMPET, HYDERABAD-500016**


**Chair Person Board of Studies
& University Nominee
Department of Mathematics
Osmania University**


Chairperson
BeS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

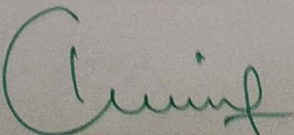
Members

D. Sarada devi

Peechpa

K. Jay

S. Manalath


**E. KOMURIAH, M.Sc., NET
Asst. Prof. of Mathematics
SRR Govt. Arts & Science College**

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Programme Outcomes

PO 1 Domain Expertise:

- Acquire comprehensive knowledge and skills.
- Make use of the knowledge in an innovative manner.
- Effectively apply the knowledge and skills to address various issues.

PO 2 Modern equipment Usage:

- Use ICT effectively.
- Access, retrieve and use authenticated information.
- Access, retrieve and use authenticated information. Have knowledge of software applications to analyze data.

PO 3 Computing Skills and Ethics:

- Develop rationale and scientific thinking process.
- Use technology intelligently for communication, entertainment and for the benefit of mankind.
- Ensure ethical practices throughout ones endeavors for the wellbeing of human race.

PO 4 Complex problem Investigation & Solving:

- Predict and analyze problems.
- Frame hypotheses.
- Investigate and interpret empirical data.
- Plan and execute action.

PO 5 Perform effectively as Individuals and in Teams:

- Work efficiently as an individual
- Cooperate, coordinate and perform effectively in diverse teams/groups.
- Prioritize common interest to individual interest.

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D. Sarada devi
Pushpa
Chairperson
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Chairperson
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007

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PO 6 Efficient Communication & Life Skills:

- Express thoughts in an effective manner
- Listen, understand and project views in a convincing manner.
- Decide appropriate media to share information
- Develop skills to present significant information clearly and concisely to interested groups.

PO 7 Environmental Sustainability:

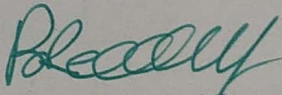
- Understand sensibly the Environmental challenges.
- Think critically on environment sustainability measures.
- Propagate and follow environment friendly practices.

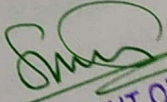
PO 8 Societal contribution:

- Render service for the general good of the society.
- Involve voluntarily in social development activities at Regional, National, global levels.
- Have own pride in volunteering to address societal issues viz: calamities, disasters, poverty, epidemics.
- Be a patriotic citizen to uphold the values of the nation

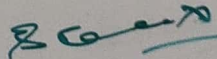
PO 9 Effective Project Management:

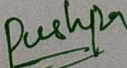
- Identify the goals, objectives and components of a project and decide the appropriate time of completion.
- Plan, organize and direct the endeavors of teams to achieve the set targets in time.
- Be competent in identifying opportunities and develop strategies for contingencies.

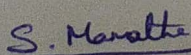

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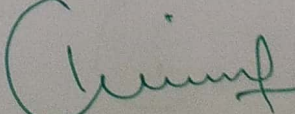

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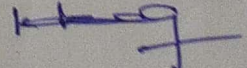
Sign. of BoS:




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S. Manalthe


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PROGRAMS SPECIFIC OUTCOMES (PSOs)

After completion of Bachelor of Science (B.Sc.) course with mathematics, students will be able to

PSO1: Explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and validity of the results.

PSO2: Continue to acquire mathematical knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematics.

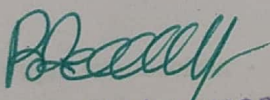
PSO3: Propose new, mathematical questions and suggest statistical analysis with appropriate software packages and /or computer programming to find solutions to these questions. (Applicable for mathematics and computer science combination).

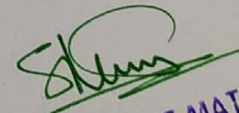
PSO4: Use computer calculations as a tool to carry out scientific investigations and develop new variants of the acquired methods if required by the problem at hand. (Applicable for mathematics and computer science combination).

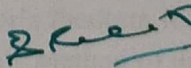
PSO5: Get PG seat in a good university, further, after completion of PG, crack lectureship and fellowship exams approved by UGC like CSIR-NET and SET with an in depth conceptual foundation at UG level.

PSO6: Apply knowledge of Mathematics in all the fields of learning including higher research and its extension.

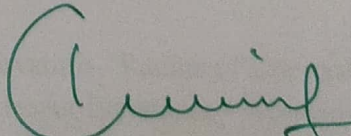
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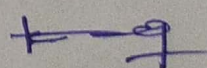

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S. Manalathu


E. KOMURAI AH, M.Sc., NET
Asst. Prof. of Mathematics
SRR Govt. Arts & Science College
KARIMNAGAR



SEMESTER-I

DIFFERENTIAL AND INTEGRAL CALCULUS

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

The course is aimed at exposing the students to the foundations of differential and integral calculus which will be useful in understanding various physical phenomena and develop sense of applicability in other areas of science.

COURSE OUTCOMES (COs):

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

CO1: Gain an understanding of partial differentiation Equations.

CO2: Deliberate in depth functions of two variables.

CO3: Verify whether a given function is continuous or not at a given point by an understanding of neighborhood of a point in (a,b).

CO4: Find the limit of a function of two variables.

CO5: Apply and solve homogeneous functions.

CO 6: Differentiate composite functions and implicit functions.

CO7: Compute radius of curvature and length of arc as a function.

CO 8: Determine the area of the surface of the frustum of a cone.

UNIT- I

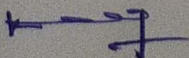
Partial Differentiation: Introduction - Functions of two variables - Neighborhood of a point (a, b) - Continuity of a Function of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two Variables - Homogeneous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

UNIT- II

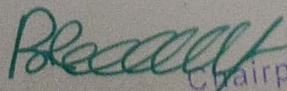
Theorem on Total Differentials - Composite Functions - Differentiation of Composite Functions - Implicit Functions - Equality of $f_{xy}(a, b)$ and $f_{yz}(a, b)$ - Taylor's theorem for a function of two Variables - Maxima and Minima of functions of two variables - Lagrange's Method of undetermined multipliers.

UNIT- III

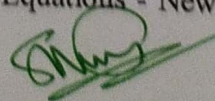
Curvature and Evolutes: Introduction - Definition of Curvature - Radius of Curvature - Length of Arc as a Function, Derivative of arc - Radius of Curvature - Cartesian Equations - Newtonian Method - Centre of



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Curvature - Chord of Curvature. Evolutes: Evolutes and Involutives - Properties of the evolutes. Envelopes: One Parameter Family of Curves - Consider the family of straight lines - Definition - Determination of Envelope.

UNIT- IV

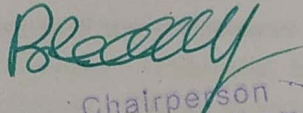
Lengths of Plane Curves: Introduction - Expression for the lengths of curves $y = f(x)$ - Expressions for the length of arcs $x = f(y)$; $x = f(t)$, $y = \phi(t)$; $r = f(\theta)$ Volumes and Surfaces of Revolution: Introduction - Expression for the volume obtained by revolving about either axis - Expression 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 - Pappu's Theorems - Surface of revolution.

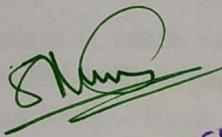
Prescribed Text Books:

- Shanti Narayan, P.K. Mittal Differential Calculus, S.CHAND, NEW DELHI 5
- Shanti Narayan Integral Calculus, S.CHAND, NEW DELHI

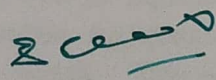
Reference Books:

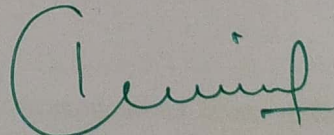
- William Anthony Granville, Percy F Smith and William Raymond Longley; Elements of the differential and integral calculus
- Joseph Edwards, Differential calculus for beginners
- Smith and Minton, Calculus
- Elis Pine, How to Enjoy Calculus
- Hari Kishan, Differential Calculus

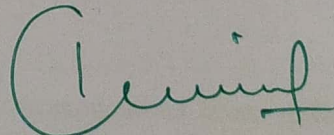

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SEMESTER-II

DIFFERENTIAL EQUATIONS

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE 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.

COURSE OUTCOMES (COs):

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

CO1: Gain the complete understanding of linear differential equations of first order and first degree.

CO2: Deliberate in depth differential equations of first order and first degree.

CO3: Verify whether a given differential equation is exact or not.

CO4: Identify the appropriate integrating factors to make a non-exact differentiable equation to exact.

CO5: Apply and solve first order differential equations

CO6: 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 Tumor 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 $P(D)y = Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}$, $b \sin ax/b \cos ax$, bx^k , Ve^{ax} - Method of undetermined coefficients.

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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.

Prscribed Text Book:

- Zafar Ahsan, Differential Equations and Their Applications

Reference Books:

- 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 McLeod; Classical Methods in Ordinary Differential Equations.

Bhaskar



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M. S. R.

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S. G. S.

E. Komuriah

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Sign. of BoS:

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S. Manalath

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SEMESTER-III

REAL ANALYSIS

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

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

COURSE OUTCOMES:

After the completion of the course students will be in a position to

- CO 1: Appreciate beauty and applicability of the course.
- CO 2: Deliberate in details real number systems
- CO 3: Give examples of sequences and series.
- CO 4: Understand the underlying vital basic concepts of real analysis such as epsilon-delta definition of limit of a sequence and convergence of a sequence.
- CO 5: Determine the continuity and uniform continuity of a function at a point.
- CO 6: Compute limits of given functions
- CO 7: Explain the properties of continuous functions
- CO 8: Prove and apply the mean value theorems
- CO 9: Elaborate the geometrical representations of mean value theorems
- CO 10: Apply Taylor's and Maclaurin's theorems
- CO 11: Differentiate the Darboux and Riemann integrals
- CO 12: Gain the significance of Fundamental theorem of Integral calculus in integration.

UNIT- I

Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences. Monotone Sequences and Cauchy Sequences –Sub sequences- Lim sup's and Lim inf's-Series- Tests of convergence - Alternating Series and Integral Tests.

UNIT- II

Continuity: Continuous Functions -Properties of Continuous Functions -Uniform Continuity - Limits of Functions

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UNIT- III

Differentiation: Basic Properties of the Derivative - The Mean Value Theorem - L'Hospital Rule - Taylor's Theorem .

UNIT- IV

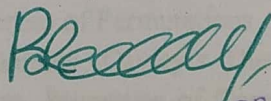
Integration : The Riemann Integral - Properties of Riemann Integral-Fundamental Theorem of Calculus.

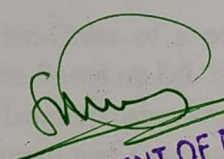
PRESCRIBED TEXT BOOK :

- Kenneth A Ross ,Elementary Analysis-The Theory of Calculus.

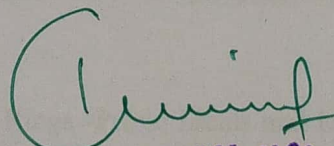
REFERENCE BOOKS:

- S.C. Malik and Savita Arora, Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International (P) Limited, New Delhi, 1994.
- William F. Trench, Introduction to Real Analysis
- Lee Larson , Introduction to Real Analysis I
- Shanti Narayan and Mittal, Mathematical Analysis
- Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; Elementary Real analysis
- Sudhir R., Ghorpade, Balmohan V., Limaye; A Course in Calculus and Real Analysis 9 1.4


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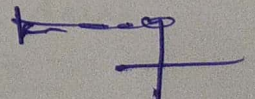

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SEMESTER-IV

ALGEBRA

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

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

COURSE OUTCOMES:

On successful completion of the course students will be able to

CO1: Recognize algebraic structures that arise in matrix algebra, linear algebra.

CO 2: Apply the skills learnt in understanding various such subjects.

CO 3: Give examples of various groups and subgroups under various binary operations.

CO 4: Identify generators of cyclic groups.

UNIT- I

Groups: Definition and Examples of Groups- Elementary Properties of Groups- Finite Groups –Order of a group, order of an element- Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups. Cyclic Groups: Properties of Cyclic Groups - Classification of Subgroups ,Cyclic Groups.

UNIT- II

Permutation Groups: Definition and Notation -Cycle Notation-Order of a permutation-Even and odd permutations-Properties of Permutations -A Check Digit Scheme Based on D5. Isomorphisms: Motivation-Definition and Examples -Cayley's Theorem- Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem- Properties of Cosets - Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball.

UNIT- III

Normal Subgroups and Factor Groups: Normal Subgroups-FactorGroups-Applications of Factor Groups - Group Homomorphisms - Definition and Examples -Properties of Homomorphisms -The First Isomorphism Theorem. Introduction to Rings: Motivation and Definition -Examples of Rings -Properties of Rings - Subrings. Integral Domains: Definition and Examples - Fields –Characteristics of a Ring.

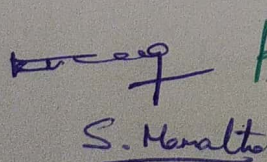
UNIT- IV


Ideals and Factor Rings: Ideals -Factor Rings -Prime Ideals and Maximal Ideals. Ring Homomorphisms: Definition and Examples-Properties of Ring- Homomorphisms.

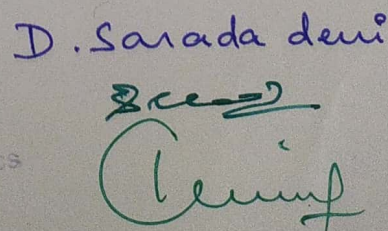
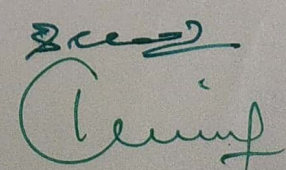
PRESCRIBED TEXT BOOK :

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

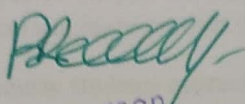
REFERENCE BOOKS:

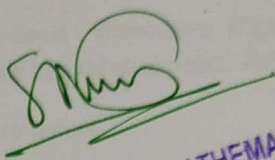

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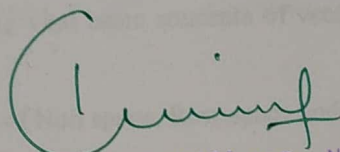

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- Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R, Basic Abstract Algebra
- Fraleigh, J.B, A First Course in Abstract Algebra.
- Herstein, I.N, Topics in Algebra
- Robert B. Ash, Basic Abstract Algebra
- I Martin Isaacs, Finite Group Theory
- Joseph J Rotman, Advanced Modern Algebra


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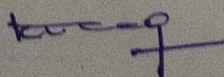



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SEMESTER-V
LINEAR ALGEBRA

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

The students are exposed to various concepts like vector spaces, basis, dimension, Eigen values, Eigen vectors, orthogonalisation and inner product which have applications in modern science and technology.

After completion this course students appreciate its interdisciplinary nature.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

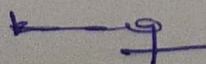
- CO 1: Appreciate beauty and applicability of the course.
- CO 2: Deliberate in details vector spaces.
- CO 3: Give examples of vector spaces and sub spaces.
- CO 4: Understand the underlying vital basic concepts of vector space such as pivot columns and pivot positions
- CO 5: Determine the dimensions of Null space, Row space and Column space of a given matrix.
- CO 6: Compute Ranks of Null space, Row space and Column space of a given matrix.
- CO 7: Evaluate the Eigen values and Eigen vectors.
- CO 8: Prove and apply the concepts of Eigen values and Eigen vectors in other areas of mathematics.
- CO 9: Establish the complex eigen values and eigen vectors.
- CO 10: Apply Linear algebra concepts to differential equations.
- CO 11: Write the characteristic equation for a given matrix.
- CO 12: Differentiate between Linear dependence and linear independence of sets.

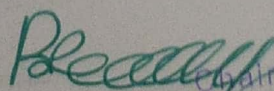
UNIT- I

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

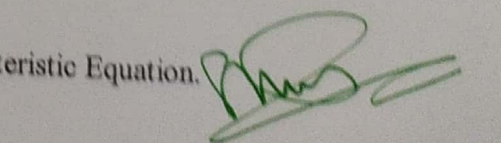
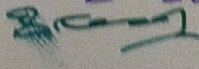
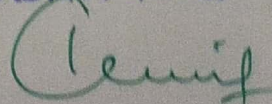
Rank-Change of Basis – Eigen values and Eigenvectors - The Characteristic Equation.


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UNIT- III

Diagonalization -Eigenvectors and Linear Transformations-Complex Eigenvalues-Applicationsto Differential Equations.

UNIT-IV

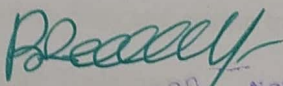
Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

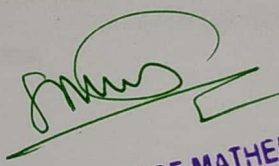
PRESCRIBED TEXT BOOK :

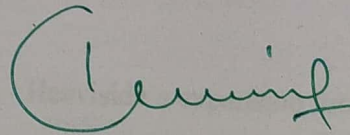
- David C Lay, Linear Algebra and its Applications

REFERENCE BOOKS:

- S Lang, Introduction to Linear Algebra
- Gilbert Strang , Linear Algebra and its Applications • Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; Linear Algebra
- Kuldeep Singh; Linear Algebra
- Sheldon Axler; Linear Algebra Done Right


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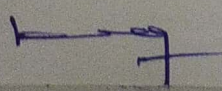


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SEMESTER VI

VI- A

INTEGRAL TRANSFORMS

Theory: 5 credits and Tutorials: 0 credits

Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE: The students will be exposed to Integral Transforms. The students also learn the Applications of Laplace Transforms to Differential Equations which arise in Physics and Engineering Problems.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Apply their knowledge to solve some problems on special functions and Differential Equations by using the Integral Transforms.

CO 3: Evaluate the Inverse Transformations.

CO 4: Understand and apply the Convolution theorem - Heaviside's expansion formula.

CO 5: Determine the solutions of simultaneous ordinary differential equations

CO 6: Apply Integral Transforms concepts to Partial differential equations.

CO 7: Write Fourier Transforms- Sine and cosine transforms.

CO 8: Compute Inverse Fourier Transforms.

UNIT- I

Laplace Transforms-Definition-Existence theorem-Laplace transforms of derivatives and integrals - Periodic functions and some special functions.

UNIT- II

Inverse Transformations - Convolution theorem - Heaviside's expansion formula.

UNIT- III

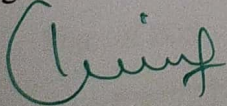
Applications to ordinary differential equations - solutions of simultaneous ordinary differential equations - Applications to Partial differential equations.

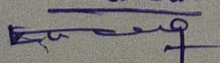
UNIT- IV

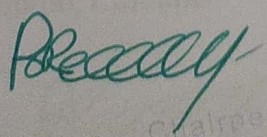
Fourier Transforms- Sine and cosine transforms-Inverse Fourier Transforms.

PRESCRIBED TEXT BOOK : Vasishtha and Gupta, Integral Transforms, Krishna Prakashan, Meerut (2e)

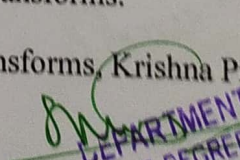
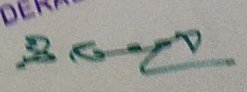
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SEMESTER VI

VI - B

ANALYTICAL SOLID GEOMETRY

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

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

COURSE OUTCOMES:

- CO1: Students understand the beautiful interplay between algebra and geometry.
- CO 2: Apply their knowledge to solve some problems on Circle, intersection of a Sphere and a Line.
- CO 3: Write equation of a Tangent Plane. Evaluate angle of Intersection of Two Spheres. Find Radical Plane.
- CO 4: Understand and apply the concepts of Cone.
- CO 5: Differentiate the Right Circular Cone- the Cylinder and the Right Circular Cylinder.
- CO 6: Write the general equation of the Second Degree.
- CO 7: Determine intersection of line with a conicoid and plane of contact.

UNIT- I

Sphere: Definition-The Sphere through four given points-Equations of a Circle-Intersection 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.

UNIT- III

The Right Circular Cone -The Cylinder- The Right Circular Cylinder.

UNIT- IV

The Conicoid: The general equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder.

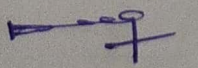
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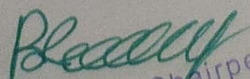
- Shanti Narayan and P K Mittal, *Analytical Solid Geometry* (17e)


REFERENCE BOOKS:

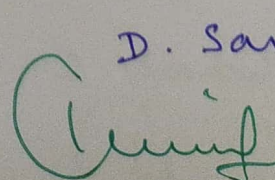
- Khaleel Ahmed, *Analytical Solid Geometry*
- S L Loney, *Solid Geometry*
- Smith and Minton, *Calculus*

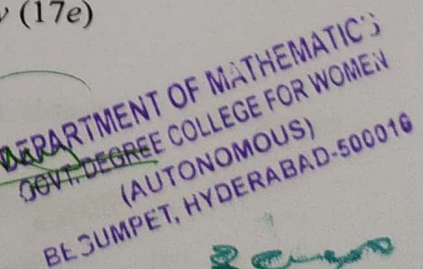
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- S.S.Sastry, Introductory Methods of Numerical Analysis, PHI

REFERENCE BOOKS:

- Richard L. Burden and J. Douglas Faires, Numerical Analysis (9e)
- 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 1.7

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SKILL ENHANCEMENT COURSES

B.Sc., II Year

SEMESTER III

SEC-II

THEORY OF EQUATIONS

Theory: 2 credits

Theory: 2 hours /week

COURSE OBJECTIVE:

Students learn the relation between roots and coefficients of a polynomial equation, Descartes's rule of signs in finding the number of positive and negative roots if any of a polynomial equation besides some other concepts of Numerical Analysis.

COURSE OUTCOMES:

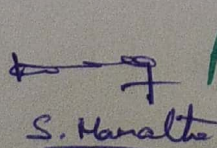
After the completion of the course students will be in a position to

- CO 1: Appreciate beauty and applicability of the course.
- CO 2: Deliberate in details of theory of equations.
- CO 3: Compute maxima and minima values of polynomials.
- CO 4: Determine the number of roots of an equation.
- CO 5: Use Descartes' Rule of signs for positive and negative roots.
- CO 6: Establish relation between the roots and coefficients of given polynomial.
- CO 7: Apply the theorem on relation between the roots and coefficients of given polynomial.
- CO 8: Evaluate the cube roots units.
- CO 9: Give examples of roots of symmetric functions.

UNIT- I

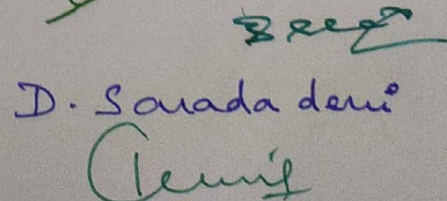
Graphic representation of a polynomial-Maxima and minima values of polynomials-Theorems relating to the real roots of equations-Existence of a root in the general equation -Imaginary roots Theorem determining the number of roots of an equation-Equal roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots.

UNIT- II


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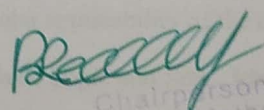
Relations between the roots and coefficients-Theorem-Applications of the theorem-Depression of an equation when a relation exists between two of its roots-The cube roots of unity Symmetric functions of the roots-examples.

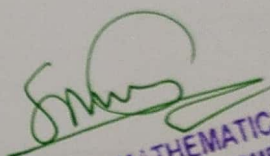
PRESCRIBED TEXT BOOK :

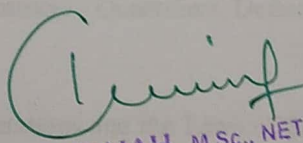
- W.S. Burnside and A.W. Panton, The Theory of Equations

REFERENCE BOOKS:

- C. C. Mac Duffie, Theory of Equations
- Hall and Knight, Higher Algebra 25 1.10


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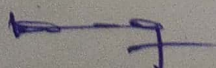

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KARIMNAGAR

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D. Sarada devi

S. Manjatha



SEMESTER III

SEC-II

LOGIC AND SETS

Theory: 2 credits ; Theory: 2 hours /week

COURSE OBJECTIVE:

Students learn some concepts in set theory and logic and appreciate its importance in the development of computer science.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Deliberate in details of Logic and Sets . Identify Laws of Logic. Draw Venn diagrams.

CO 3: Use axioms of probability. Establish the basic connectives and truth tables.

CO 4: Apply the Quantifiers. Evaluate the cube roots units. Give examples of Discrete Random variables

UNIT- I

Basic Connectives and truth tables - Logical equivalence: Laws of Logic - Logical Implication : Rules Inference : The Use of Quantifiers - Quantifiers, Definitions, and proofs of Theorems.

UNIT- II

Sets and Subsets - Set Operations and the Laws of Set Theory - Counting and Venn Diagrams - A First Word on Probability - The axioms of Probability - Conditional Probability: Independence - Discrete Random variables.

PRESCRIBED TEXT BOOK :


- Ralph P Grimaldi, Discrete and Combinatorial Mathematics (5e)

REFERENCE BOOKS:

- P R Halmos, Naive Set Theory
- E Kamke , Theory of Sets 26 Semester – IV Sec- II 27 28 29 30

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DEPARTMENT OF MATHEMATICS
GOVT. DEGREE COLLEGE FOR WOMEN
(AUTONOMOUS)
BE JUMPET, HYDERABAD-500016

[Handwritten Signature]

D. Sarada Devi

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E. KONURATHAN, M.Sc. NET
Asst. Prof. of Mathematics
SRR Govt. Arts & Science College
KARJANAGAR.

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SEMESTER IV
SEC-IV
NUMBER THEORY

Theory: 2 credits ; Theory: 2 hours /week

COURSE OBJECTIVE:

Students will be exposed to some of the jewels like Fermat's theorem, Euler's theorem in the number theory.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course. Deliberate in details of Number theory. Prove the Goldbach conjecture.

CO 2: Explain the properties of congruencies. Write binary and decimal representations of integers.

CO 3: Establish the number theoretic functions. Apply Euler's generalization of Fermat's theorem. Use Euler's Phi function. Give examples of Sum and Number of Divisors.

UNIT- I

The Goldbach conjecture - Basic properties of congruences- Binary and Decimal Representation of Integers - Number Theoretic Functions; The Sum and Number of divisors- The Mobius Inversion Formula- The Greatest integer function.

UNIT- II

Euler's generalization of Fermat's Theorem: Euler's Phi function- Euler's theorem Some Properties of the Euler's Phi function.

PRESCRIBED TEXT BOOK :

- David M Burton, Elementary Number Theory (7e)

REFERENCE BOOKS:

- Thomas Koshy, Elementary Number Theory and its Applications
- Kenneth H Rosen, Elementary Number Theory 35 1.12

Sign. of BoS:

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Chairperson
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

S. Manalath

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SEMESTER IV

SEC-IV

VECTOR CALCULUS

Theory: 2 credits ; Theory: 2 hours /week

COURSE OBJECTIVE:

Concepts like gradient, divergence, curl and their physical relevance will be taught. Students realize the way vector calculus is used to address some of the problems of physics.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Establish the work done against a force and evaluate line integrals.

CO 2: Write binary and decimal representations of integers. Determine conservative vector fields.

CO 3: Find surface integrals. Understand the concepts of gradient, divergence, curl and establish relations among them. Compute volume integrals. Apply Taylor's series.

CO 4: Use gradient of a scalar field. Write binary and decimal representations of integers. Determine conservative fields and potentials.

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.


PRESCRIBED TEXT BOOK :

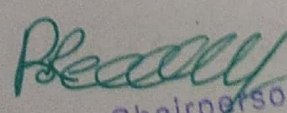
- Vector Calculus by P.C. Matthews.

REFERENCE BOOKS:

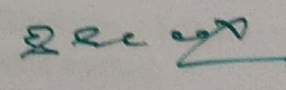
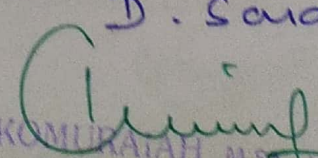
- Calculus by G.B. Thomas and R.L. Finney.
- Calculus by H. Anton, I. Bivens and S. Davis.
- , Calculus by Smith and Minton.

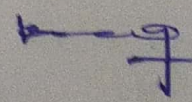
Sign. of BoS:


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Chairperson
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

S. Manalt


D. Sarada devi

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SEMESTER-V

GENERIC ELECTIVE

BASIC MATHEMATICS

Theory: 4 credits and Tutorials: 0 credits

Theory: 4 hours /week and Tutorials: 1 hours /week

COURSE OBJECTIVE:

Students learn the techniques which have been applied successfully to an increasingly wide variety of complex problems in business. Also learn the scientific approach to managerial decision making.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Realize how the quantitative analysis will be an aid in decision-making process.

CO 2: Understand how the quantitative analysis can be linked with other information in making decisions.

CO 3: Apply the concepts of matrices and determinants.

CO 4: Evaluate rank, adjoint and find solutions of systems of linear equations.

Unit- I

Coordinate Geometry: Fundamentals – Cartesian Coordinatesystem – Polar Coordinates – Distance Formula – Section Formula -Centroid of a Triangle – Area of a Triangle.(Chapter 11)

Unit- II

Straight Line: Introduction - Definitions of the Terms - Different Forms of the Equations of a Straight Line - Distance of a point from a Straight Line - Angle between two Lines and Condition of Parallelism and Perpendicularity of Lines - Point of intersection of Two Lines – Condition of Concurrency of Three Given Straight Lines - Position of a Point with respect to a given Line.(Chapter 13)

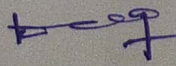
Unit- III

Matrices: Introduction - Definitions and Notations - Operations on Matrices - Determinant of a Square Matrix - Non Singular matrix and Singular Matrix - Sarrus Diagram for Expansion of Determinant of a matrix 3X3 - Properties of Determinants.(15.1,15.2,15.3,15.5.1,15.5.2,15.5.3 of Chapter 15)

Unit- IV

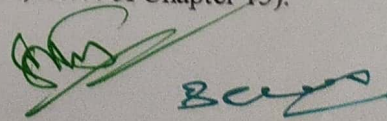
Linear System of Equations: Conversion of a business problem into a Linear System of Equations – Rank of a Matrix – Application of Rank concept – Minor and Cofactor – Adjoint of a Square matrix -Inverse of a Square Matrix – Matrix Equation – Methods to Solve Linear System of Equations – Solution to the linear system of Equations – Types of Solutions – Crammer's rule, matrix inversion method.

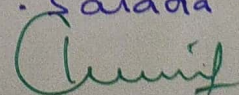
(15.4,15.5.4,15.5.5,15.5.6,15.5.7,15.5.8,15.6,15.7.1,15.7.2,15.7.3,15.7.4,15.7.4 of Chapter 15).


S. Marathe



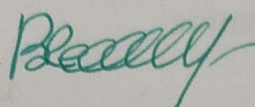
Chandraperson
Bos in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.




D. Sarada devi


PRESCRIBED TEXT BOOK :

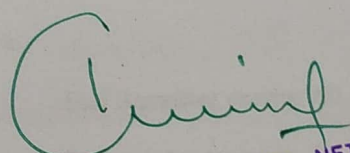
- P. Mariappan , Business Mathematics, Pearson Publication 2015, New Delhi.


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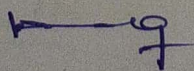



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Sign. of BoS:

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S. Manalita



GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
BEGUMPET, HYDERABAD

DEPARTMENT OF MATHEMATICS

SCHEME OF EVALUATION

MODULE

B.Sc., Mathematics - Semesters I, II, III, IV, V and VI.

MODULE:

Theory : Max Marks: 100

Split :

End Semester exams: 60

Internal Assessment: 40

GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
BEGUMPET, HYDERABAD

DEPARTMENT OF MATHEMATICS

Skill Enhancement Courses (Semesters III & IV)

SCHEME OF EVALUATION

MODULE

Theory : Max Marks: 50

Split :

End Semester exams: 40

Internal Assessment: 10

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
BEGUMPET, HYDERABAD

DEPARTMENT OF MATHEMATICS
GENERIC ELECTIVE (SEMESTER V)
SCHEME OF EVALUATION

MODULE

Theory : Max Marks: 100

Split :

End Semester exams: 60

Internal Assessment: 40

GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
BEGUMPET, HYDERABAD

DEPARTMENT OF MATHEMATICS

B.Sc., Mathematics - Study Project (Semester VI)
SCHEME OF EVALUATION

MODULE:

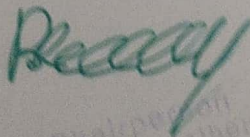
Theory : Max Marks: 100

Split :


Study project thesis : 60

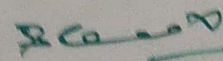
Presentation & viva : 40

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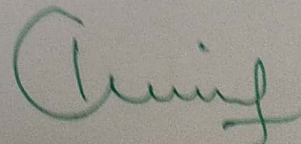

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GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)
BEGUMPET, HYDERABAD

DEPARTMENT OF MATHEMATICS

MODEL QUESTION PAPER FOR B.Sc., I, II, III, IV, V & VI SEMESTERS

TIME: 2 ½ hrs

Max Marks: 60

SECTION -A

NOTE: Answer any 5 of the following. Each question carries 4 marks $5 \times 4 = 20$ Marks

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

SECTION -B

Note: Answer all the questions. Each question carries 10 marks $4 \times 10 = 40$ Marks.

9. a) Unit-I

(or)

b) Unit-I

10. a) Unit-II

(or)

b) Unit-II

11. a) Unit-III

(or)

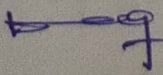
b) Unit-III

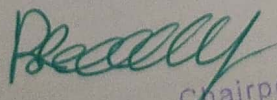
12. a) Unit-IV

(or)

b) Unit-IV


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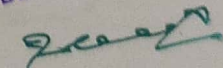
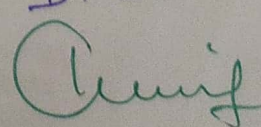

S. Manalthe





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GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD
AUTONOMOUS

DEPARTMENT OF MATHEMATICS

LIST OF PANEL OF EXAMINERS FOR MATHEMATICS

B.SC. I, II AND III YEAR

S.No	SEM	PAPER	TITLE OF THE PAPER	NAME OF EXAMINER	CONTACT NUMBER	E MAIL ID.
1	1	1	Differential and	Dr. M. S. S. S. S.		

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DEPARTMENT OF MATHEMATICS

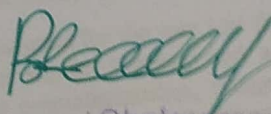
BoS Meeting on 05/10/2021

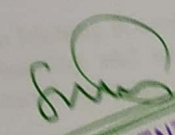
MINUTES OF THE MEETING

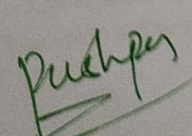
The following resolutions are taken in the meeting.

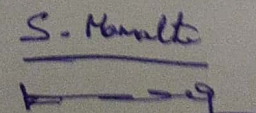
1. The syllabus and credits for I, II semesters of B.Sc., I year, III, IV semesters of B.Sc., II year and V, VI semesters of B.Sc., III year as per CBCS (Choice Based Credit System) have been approved.
2. Approval of the paper Numerical Analysis/Study Project for VI Semester of B.Sc., III year as per CBCS (Choice Based Credit System) for 2019-2022 batch .
3. Approval of Optional/ Study Project for VI Semester of B.Sc., III year as per CBCS (Choice Based Credit System) for 2020-2023& 2021-2024 batches.
4. Skill Enhancement Courses in Mathematics for III and IV Semesters of B.Sc., II Year have been approved .
5. Generic Elective for semester V has been approved.
6. Scheme of evaluation-examination pattern to be followed for all semesters has been approved.
7. Scheme of Evaluation of study project has been approved.
8. Certificate courses have been approved.
9. List of panel examiners has been approved.

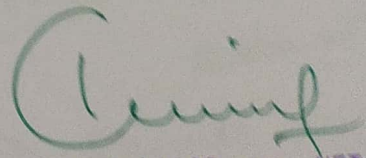
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DEPARTMENT OF MATHEMATICS

CERTIFICATE COURSES