Government Science College, Vankal

Department of Zoology

Short Term Course

Course Code: STCZO04 **Course Name:** Aquarium Management **Duration:** 30 h

INTRODUCTION

Aquarium management involves the care and maintenance of aquatic organisms and their environments. This course aims to provide comprehensive knowledge and practical skills in managing both freshwater and marine aquariums, focusing on the health and well-being of the aquatic life, as well as the operational aspects of running an aquarium.

OBJECTIVES

- To introduce the principles of aquarium management.
- To understand the biological and chemical processes in aquatic systems.
- To learn about the care and maintenance of different types of aquatic organisms.
- To gain practical skills in aquarium setup, maintenance, and problem-solving.
- To explore the roles of aquariums in conservation and education.

MODULES

Module 1: Introduction to Aquarium Management (5 Hours)

- History and types of aquariums
- Functions and roles of public and private aquariums
- Ethical considerations in aquarium management

Module 2: Aquatic Biology and Chemistry (5 Hours)

- Water chemistry: pH, hardness, salinity, and nitrogen cycle
- Biological filtration and ecosystem balance
- Overview of freshwater and marine biology
- Common aquatic plants and their care

Module 3: Aquarium Setup and Maintenance (5 Hours)

- Designing and setting up freshwater and marine aquariums
- Equipment selection and installation (filters, heaters, lighting)
- Routine maintenance and water quality management
- Troubleshooting common aquarium problems

Module 4: Care of Aquatic Organisms (5 Hours)

- Species selection and compatibility
- Feeding practices and nutrition
- Health monitoring and disease prevention
- Breeding and rearing aquatic organisms

Module 5: Conservation and Education (5 Hours)

- Role of aquariums in conservation efforts
- Breeding programs and species preservation
- Public education and community outreach
- Case studies of successful conservation initiatives

Module 6: Practical Hands-on Sessions (5 Hours)

- Hands-on aquarium setup and maintenance
- Water testing and quality management
- Identifying and treating common diseases
- Developing educational programs and exhibits

OUTCOMES

- Understand the principles and ethical considerations of aquarium management.
- Demonstrate knowledge of aquatic biology and chemistry.
- Apply practical skills in setting up, maintaining, and troubleshooting aquariums.
- Provide proper care and nutrition for a variety of aquatic organisms.
- Appreciate the role of aquariums in conservation and public education.

REFERENCES

- Tullock, J.H. (2006). *Natural Reef Aquariums: Simplified Approaches to Creating Living Saltwater Microcosms*. TFH Publications.

- Fenner, R.M. (2008). *The Conscientious Marine Aquarist: A Commonsense Handbook for Successful Saltwater Hobbyists*. TFH Publications.
- Moe, M.A. (1992). *The Marine Aquarium Handbook: Beginner to Breeder*. Green Turtle Publications.
- Paletta, M. (2003). *Ultimate Marine Aquariums: Saltwater Dream Systems and How They Are Created*. T.F.H. Publications.
- Aquarium Systems (www.aquariumsystems.com)

EVALUATION

- **Quizzes (30%)**: Short quizzes at the end of each module to assess understanding.
- **Assignments (30%)**: Written assignments on specific topics such as water chemistry, species care, or conservation strategies.
- **Practical Project (40%)**: Completion of a hands-on aquarium setup and maintenance project, including documentation of the process and techniques used.

ISSUE OF MARKSHEET AND CERTIFICATE

The college shall publish the result after evaluation and with the recommendations of course coordinator at the end of programme.

1. After successful completion of the course, no marks will be given to students only grades will be given as per follows

Percentage Range of Marks (Theory + Projects)	**Remarks**
90-100	O
80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Dr. Rajesh Senma,
HoD, Zoology Department,
GSC Vankal.

Department of Botany
Government Science College, Vankal
Ta. Mangrol, Dist. Surat
AISHE Code: C- 46595

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Short Term Course

Plant Secondary Metabolite Extraction and Standardization

Course Code: STCBO04

Course Title: Plant Secondary Metabolite Extraction and Standardization

Course Duration: 30 Hours

Course Introduction

This short-term course provides a detailed understanding of the extraction and standardization of plant secondary metabolites, essential compounds with various applications in pharmaceuticals, cosmetics, and food industries. Designed for beginners, it covers the theoretical background, extraction techniques, analytical methods, and quality control measures necessary for working with plant secondary metabolites.

Course Objectives

By the end of this course, participants will:

1. Understand the role and significance of secondary metabolites in plants.
2. Learn various techniques for the extraction of secondary metabolites.
3. Gain proficiency in analytical methods for the identification and quantification of these compounds.
4. Explore standardization processes to ensure quality and consistency.
5. Acquire knowledge about the applications and regulatory aspects of plant secondary metabolites.

Module Outline and Outcomes

Module 1: Introduction to Plant Secondary Metabolites (5 hours)

- **Topics Covered:**
    - Definition and classification of secondary metabolites
    - Biological functions and ecological significance
    - Overview of their applications in various industries
- **Outcome:**

- Students will understand the importance of plant secondary metabolites and their applications.

Module 2: Techniques for Extraction of Secondary Metabolites (7 hours)

- **Topics Covered:**
  - Solvent extraction methods (maceration, Soxhlet extraction)
  - Advanced extraction techniques (supercritical fluid extraction, microwave-assisted extraction)
  - Factors affecting extraction efficiency
- **Outcome:**
  - Students will learn different extraction techniques and understand how to optimize them for various plant materials.

Module 3: Analytical Methods for Identification and Quantification (8 hours)

- **Topics Covered:**
  - Chromatographic techniques (HPLC, GC, TLC)
  - Spectroscopic methods (UV-Vis, NMR, MS)
  - Sample preparation and purification
- **Outcome:**
  - Students will gain proficiency in using analytical techniques for identifying and quantifying secondary metabolites.

Module 4: Standardization of Plant Extracts (6 hours)

- **Topics Covered:**
  - Importance of standardization
  - Methods for standardizing extracts (marker compounds, bioassays)
  - Quality control measures
- **Outcome:**
  - Students will understand the processes and importance of standardizing plant extracts to ensure quality and consistency.

Module 5: Applications and Regulatory Aspects (4 hours)

- **Topics Covered:**
  - Applications in pharmaceuticals, cosmetics, and food industries
  - Case studies of successful applications

- Regulatory requirements and guidelines

- **Outcome:**
  - Students will explore the diverse applications of plant secondary metabolites and understand the regulatory framework governing their use.

Evaluation

1. **Quizzes (30%)** - Quizzes at the end of each module to assess understanding of key concepts.
2. **Practical Assignments (40%)** - Hands-on assignments involving extraction, analysis, and standardization techniques.
3. **Final Project (20%)** - A comprehensive project involving the extraction and standardization of a chosen plant secondary metabolite.
4. **Participation (10%)** - Active participation in discussions and practical sessions.

Recommended Reading

- "Natural Products: A Practical Guide" by Raphael Ikan
- "Plant Secondary Metabolites: Occurrence, Structure, and Role in the Human Diet" by Alan Crozier, Michael N. Clifford, and Hiroshi Ashihara
- "Handbook of Natural Products Chemistry" by Abbas G. Bribiescas

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Issue of Marksheet and Certificate

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90-100	O
80-90	A
60-80	B
40-60	C
<40	F

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Course Co-ordinator:

Dr. Meghna Adhvaryu,

HoD, Department of Botany,

GSC Vankal

Government Science College, Vankal

Department of Microbiology

Short Term Course

Course Code: STCMB07 **Course Name:** Emerging and Re-emerging Diseases **Duration:** 30 h

Introduction

Emerging and reemerging infectious diseases pose significant challenges to global health. This course provides an in-depth understanding of these diseases, focusing on their epidemiology, pathogenesis, diagnostic methods, treatment, and prevention. Students will explore real-world case studies and global health strategies to address these threats. This course has become very relevant after the corona pandemic.

Objectives

- Understand the concepts and significance of emerging and reemerging diseases.
- Identify factors contributing to disease emergence and reemergence.
- Gain knowledge of the epidemiology, clinical manifestations, diagnosis, treatment, and prevention of key diseases.
- Analyze global health responses and strategies for disease control and prevention.
- Develop skills to evaluate and respond to infectious disease outbreaks.

Course Modules

Module 1: Introduction to Emerging and Reemerging Diseases (5 hours)

- Definition and significance
- Historical perspective and notable outbreaks
- Contributing factors (environmental, social, and biological)
- Global impact on public health

Module 2: Epidemiology and Surveillance (5 hours)

- Principles of epidemiology
- Disease surveillance systems
- Role of public health organizations (WHO, CDC)
- Case studies of surveillance and outbreak investigations

Module 3: Pathogenesis and Clinical Manifestations (5 hours)

- Pathogen transmission and infection mechanisms
- Host-pathogen interactions
- Clinical features of selected diseases (e.g., Zika, Ebola, COVID-19, Tuberculosis, Dengue)

Module 4: Diagnostic Techniques (5 hours)

- Laboratory methods for disease diagnosis
- Molecular diagnostic techniques (PCR, sequencing)
- Serological tests and rapid diagnostics
- Challenges and limitations of current diagnostic methods

Module 5: Treatment and Prevention (5 hours)

- Antimicrobial therapies and resistance
- Vaccines and immunization strategies
- Infection control practices
- Public health interventions

Module 6: Global Health Responses and Future Challenges (5 hours)

- International collaboration and response strategies
- One Health approach in disease prevention
- Impact of climate change and globalization
- Future challenges and research priorities

References

1. Heymann, D. L. (Ed.). (2015). Control of Communicable Diseases Manual. APHA Press.
2. Morse, S. S., &Schluederberg, A. (1990). Emerging Viruses: The Evolution of Viruses and Viral Diseases. Journal of Infectious Diseases, 162(1), 1-7.
3. Centers for Disease Control and Prevention (CDC). (n.d.). Emerging Infectious Diseases. Retrieved from CDC Website.
4. World Health Organization (WHO). (n.d.). Emerging Diseases. Retrieved from WHO Website.

Learning Outcomes

Upon completion of the course, students will be able to:

- Explain the factors leading to the emergence and reemergence of infectious diseases.
- Describe the epidemiology and clinical features of key emerging and reemerging diseases.
- Utilize diagnostic techniques to identify infectious diseases.
- Propose effective treatment and prevention strategies.
- Critically evaluate global health responses to disease outbreaks.

Evaluation Methods

- **Quizzes and Assignments (50%)**: To assess understanding of theoretical concepts.
- **Case Study Analyses (30%)**: Evaluating students' ability to apply knowledge to real-world scenarios.
- **Group Discussions and Participation (20%)**: Encouraging collaborative learning and critical thinking.

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90-100	O
80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Dr. Nishant Junnarkar,
HoD, Microbiology Department,
GSC Vankal.

Government Science College, Vankal

Department of Chemistry

Short Term Course

Course Code: STCCH07 **Course Name:** Types of Titrations in Analytical Chemistry **Duration:** 30 h

Types of Titrations in Analytical Chemistry

INTRODUCTION

Titration is a fundamental technique in analytical chemistry used to determine the concentration of an analyte by reacting it with a titrant. Different types of titrations are employed depending on the nature of the analyte and the titrant. This short-term course provides an in-depth understanding of various titration methods, their principles, applications, and techniques. Participants will gain practical skills and theoretical knowledge to effectively conduct and analyse titrations in different contexts.

OBJECTIVES

- Understand the principles and methodologies of different types of titrations.
- Select appropriate titration methods based on the chemical nature of analytes and titrants.
- Conduct various titrations accurately and interpret the results.
- Troubleshoot common issues encountered during titrations.
- Apply titration techniques to real-world analytical problems.

COURSE MODULES

Module 1: Introduction to Titration

- Definition and principle of titration
- General procedure and terminology
- Types of titrations and their applications

Module 2: Acid-Base Titrations

- Principles of acid-base reactions
- Strong acid-strong base titration (e.g., HCl vs. NaOH)
- Weak acid-strong base titration (e.g., CH_3COOH vs. NaOH)
- Strong acid-weak base titration (e.g., HCl vs. NH_3)
- Indicators and pH measurements

Module 3: Redox Titrations

- Principles of oxidation-reduction reactions

- Examples: Permanganate titration ($KMnO_4$), Dichromate titration ($K_2Cr_2O_7$)
- Redox indicators and their applications

Module 4: Complexometric Titrations

- Principles of complexation reactions
- Examples: EDTA titration for metal ions
- Indicators and stability constants

Module 5: Precipitation Titrations

- Principles of precipitation reactions
- Examples: Mohr's method (Cl^- with $AgNO_3$), Fajans' method
- Indicators and endpoint detection

Module 6: Non-Aqueous Titrations

- Principles and applications of non-aqueous titrations
- Examples: Titration of acids in non-aqueous solvents (e.g., in acetic acid)
- Special considerations and indicators

Module 7: Back Titrations

- Principles and applications of back titration
- Examples: Determination of excess reactants or analytes
- Procedure and calculation

Module 8: Potentiometric Titrations

- Principles of potentiometry in titrations
- Examples: pH titrations, redox potentiometric titrations
- Instrumentation and data interpretation

Module 9: Spectrophotometric Titration

- Principles of spectrophotometry in titrations
- Examples: Titrations with colorimetric indicators
- Instrumentation and analysis

Module 10: Micro Titrations

- Principles and techniques of micro titration
- Examples: Analysis of small sample volumes
- Equipment and methodology

Module 11: Applications of Titrations in Industry

- Industrial applications and quality control
- Examples: Titration in pharmaceuticals, food and beverage industry
- Case studies and practical examples

Module 12: Troubleshooting and Best Practices

- Common problems in titrations and their solutions
- Best practices for accurate and precise titration results
- Review of key concepts and technique

LEARNING OUTCOMES

Upon completion of the course, students will be able to:

- Titration Basics
  (Understand the fundamental principles and objectives of titration techniques)
- Types of Titrations
  (Learn about various titration methods, including acid-base, redox, precipitation, and complexometric titrations.)
- Procedure Mastery
  (Comprehend the procedures and calculations involved in each titration type)
- Applications
  (Apply different titration methods to real-world analytical problems)
- Error Analysis
  (Identify common sources of error and strategies for accurate titration results)

REFERENCES

1. "Quantitative Chemical Analysis" by Daniel C. Harris (Publisher: W. H. Freeman).
2. "Analytical Chemistry: A Modern Approach to Analytical Science" by David S. Moore and George C. Davis (Publisher: Wiley).
3. "Handbook of Analytical Chemistry" by Jack Cazes (Publisher: CRC Press).
4. "Modern Analytical Chemistry" by David Harvey (Publisher: McGraw-Hill Education, 2000).
5."Vogel's Textbook of Quantitative Chemical Analysis" by G. H. Jeffery, J. Bassett, J. Mendham, and R. C. Denney (Publisher: Pearson).

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90-100	O
80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Dr. Kumar Gamit,
HoD, Chemistry Department,
GSC Vankal.

Government Science College, Vankal

Department of Physics

Short Term Course

Course Code: STCPHY03
Course Name: Electronics Prototyping and Experimentation
Duration: 30 hours

Introduction:
The short-term course on "Electronics Prototyping and Experimentation" is an intensive program designed to equip participants with a comprehensive understanding of electronics prototyping, circuit design, and experimentation techniques. This course is crucial for students pursuing studies in physics, engineering, electronics, and related fields. The course combines theoretical knowledge with practical hands-on experience, ensuring that participants gain the skills needed to effectively design, build, and test electronic circuits. The skills acquired during the course will prepare students for industry roles and enhance their research competencies, significantly boosting their career prospects and contributing to advancements in electronics and related fields.

Course Objectives:

1. **Fundamental Understanding:** Provide a thorough understanding of electronics prototyping and experimentation.
2. **Circuit Design:** Teach the principles of designing electronic circuits.
3. **Prototyping Skills:** Develop skills to build and test electronic prototypes.
4. **Data Interpretation:** Enhance the ability to interpret and analyze experimental data from electronic circuits.
5. **Safety and Maintenance:** Promote best practices for the safe use and maintenance of electronic equipment.

Course Modules:

Module 1: Introduction to Electronics Prototyping (2 hours)

- Overview of electronics prototyping
- Importance and applications in various fields

Module 2: Basic Electronic Components and Tools (6 hours)

- Resistors, capacitors, inductors, diodes, transistors, and ICs
- Tools: Multimeters, oscilloscopes, soldering equipment
- Hands-on session: Identifying and using basic components and tools

Module 3: Circuit Design (6 hours)

- Principles of circuit design
- Hands-on session: Designing and simulating circuits

Module 4: Breadboarding and Soldering Techniques (5 hours)

- Basics of breadboarding
- Soldering techniques and best practices
- Hands-on session: Building and testing circuits on a breadboard

Module 5: Arduino Uno and Programming (4 hours)

- Introduction to Arduino Uno
- Basics of programming with Arduino
- Hands-on session: Programming and interfacing Arduino Uno with sensors and actuators

Module 6: Advanced Prototyping and Testing (7 hours)

- Advanced circuit design concepts
- Testing and troubleshooting techniques
- Hands-on session: Prototyping and testing a complete electronic project

Course Outcomes:

By the end of this course, students will be able to:

1. **Knowledge:** Understand the principles of electronics prototyping and experimentation.
2. **Circuit Design:** Design and simulate electronic circuits.
3. **Prototyping:** Build and test electronic prototypes using breadboards and soldering techniques.
4. **Arduino:** Program Arduino Uno and interface it with electronic components.
5. **Data Analysis:** Interpret and analyze experimental data from electronic circuits.
6. **Safety Practices:** Follow safety protocols and maintain electronic equipment properly.

Teaching Methodology:

- **Lectures:** Detailed lectures covering theoretical aspects of each module.
- **Hands-on Sessions:** Practical sessions for students to gain hands-on experience with electronic prototyping.
- **Demonstrations:** Live demonstrations of circuit design, building, and testing by instructors.

Assessment:

- **Quizzes:** Short quizzes to test understanding of theoretical concepts. Two quizzes during the course (60% of final marks).
- **Practical Exams:** Hands-on assessments to evaluate practical skills in electronics prototyping (40% of final marks).

Recommended Books:

- Basic Electronics by B. L.Theraja, S Chand Publication
- Arduino Uno: A Hands-On Guide for Beginner by Agus Kurniawan

Issue of Marksheet and Certificate

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90-100	O
80-90	A
60-80	B
40-60	C
<40	F

Course Cordinator:

Dr. Hemal Vankar,
HoD, Physics Department,
GSC Vankal.

Government Science College, Vankal

Department of Mathematics

Short Term Course

Course Code: STCMT03 **Course Name:** Quantitative Reasoning for Competitive Exams **Duration:** 30 h

Quantitative Reasoning for Competitive Exams

INTRODUCTION

Quantitative reasoning is essential for succeeding in competitive exams where problem-solving and analytical skills are tested. This course is meticulously designed to equip students with the necessary tools and techniques to tackle a wide range of quantitative problems effectively. By combining foundational theory with practical problem-solving sessions, students will enhance their quantitative abilities and gain the confidence needed to excel in competitive scenarios.

OBJECTIVES

By the end of this course, students will:

1. **Grasp Fundamental Concepts**: Achieve a comprehensive understanding of core topics including arithmetic, algebra, data interpretation, and advanced quantitative techniques.

2. **Apply Problem-Solving Strategies**: Develop and employ efficient problem-solving strategies to address complex quantitative problems.

3. **Enhance Analytical Skills**: Improve skills in data analysis, pattern recognition, and decision-making based on quantitative information.

4. **Prepare for Competitive Exams**: Build confidence through practice tests and simulated exam conditions, improving readiness for real-world competitive exams.

COURSE MODULE (30 HOURS)

Week 1: Fundamentals and Core Concepts (6 Hours)

Introduction to Quantitative Reasoning: Overview:Introduction to quantitative reasoning, its significance in competitive exams, and typical question formats.Techniques: Overview of techniques and strategies used in quantitative problem-solving.

Basic Arithmetic and Algebra: 1. **Arithmetic Concepts:**Percentages: Calculation of percentage increases, decreases, and applications in real-world scenarios.Ratios and Proportions: Solving problems involving ratios, proportions, and applications in various contexts.**2. Basic Algebra:**Linear Equations: Techniques for solving and graphing linear equations.Inequalities: Solving and interpreting inequalities and their graphical representations.**3. Number Theory Basics:** Prime Numbers: Definition, properties, and significance in problem-solving. Divisibility Rules: Rules for determining divisibility and their applications. Applications: How number theory concepts are used in competitive exams.**4. Practice Problems:**Exercises: A variety of problems designed to apply and reinforce arithmetic and algebraic concepts.

Week 2: Intermediate Arithmetic and Algebra (6 Hours)

Advanced Arithmetic: 1. Speed, Distance, and Time: Formulas: Deriving and applying formulas for speed, distance, and time calculations. Problem-Solving: Techniques for solving related problems and applications.**2.Work and Time Problems**: Concepts: Understanding rates of work and time, and solving problems involving multiple entities.

Intermediate Algebra: 1. Quadratic Equations: Solutions: Methods for solving quadratic equations (factoring, completing the square, quadratic formula). Applications: Real-world applications and problem-solving using quadratic equations.**2. Functions and Graphs:**Types of Functions: Linear, quadratic, polynomial functions, and their properties.Graphing: Techniques for graphing functions and interpreting graphs.

Week 3: Data Interpretation and Probability (6 Hours)

Data Interpretation: 1. Types of Data Representations: Tables: Techniques for extracting information and solving problems based on tabular data. Charts and Graphs: Analysis of bar charts, pie charts, line graphs, and histograms.**2. Analysis Techniques:**Trends and Patterns: Identifying trends, patterns, and outliers in data. Problem Solving: Strategies for solving data interpretation questions effectively.

Introduction to Probability: Probability Rules: Fundamental rules and calculations (addition and multiplication principles). Applications: Simple probability problems and real-world applications.Advanced Topics: Conditional probability and combinatorics (permutations and combinations).

Week 4: Advanced Quantitative Techniques (6 Hours)

Sequences and Series: 1. Arithmetic Sequences: Formulas: General term, sum of terms, and applications. Problems: Solving problems involving arithmetic sequences. **2. Geometric Sequences:** Formulas: General term, sum of terms, and applications. Problems: Solving problems involving geometric sequences.

Mathematical Reasoning and Analytical Skills: 1. Logical Reasoning: Deductive Reasoning: Techniques for solving problems through logical deductions.Inductive Reasoning: Using patterns and observations to solve problems.**2. Analytical Skills:**Complex Problems: Approaches to analyzing and solving complex quantitative problems.

Week 5: Quantitative Problem-Solving Strategies (6 Hours)

Complex Problem-Solving Techniques: Techniques: Effective strategies for tackling complex problems, including working backwards and breaking down problems.Efficiency: Techniques for improving speed and accuracy.

Application Workshops: Hands-on Problem-Solving: Intensive problem-solving sessions focusing on applying strategies to diverse problems. Strategy Development: Workshops for developing personalized strategies and refining problem-solving skills.

LEARNING OUTCOMES

Upon completing the course, students will be able to:

1. **Demonstrate Proficiency**: Show strong understanding and application of arithmetic, algebra, data interpretation, and advanced quantitative techniques.

2. **Apply Effective Strategies**: Utilize efficient problem-solving techniques and shortcuts to manage complex questions effectively.

3. **Analyse and Interpret Data**: Accurately analyze and interpret data from various formats and make well-informed decisions.

4. **Excel in Exams**: Approach competitive exam questions with confidence, precision, and improved performance.

REFERENCES

1. Books:

- "Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal

- "The Pearson Guide to Quantitative Aptitude for Competitive Exams" by Dinesh Khattar

- "How to Prepare for Quantitative Aptitude for the CAT" by Arun Sharma

2. Online Resources:

- Khan Academy: Tutorials and practice exercises for arithmetic, algebra, and data interpretation.

- Brilliant.org: Interactive problems and explanations for advanced quantitative reasoning.

- Mathway: Tool for solving algebraic problems and understanding solutions.

3. Practice Papers:

- Sample Papers: From previous years' exams and online practice resources.

- Mock Tests: Full-length practice tests for various competitive exams.

EVALUATION METHODS

1. **Weekly Quizzes**: Short quizzes at the end of each week to assess understanding and retention of the material covered.

2. **Mock Tests**: Full-length practice tests to simulate real exam conditions and evaluate overall performance.

3. **Active Participation**: Engagement in class discussions, problem-solving sessions, and workshops.

4. **Final Review**: Comprehensive assessment through final mock tests, review sessions, and discussions.

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80-90	A
60-80	B
40-60	C
<40	F

COURSE COORDINATOR:

Mr. Vanaraj D. Kagada,
HoD, Mathematics Department,
GSC Vankal.