

A.G. & S.G. Siddhartha Degree College of Arts & Science, Autonomous, Vuyyuru .

Minutes of the Meeting of Board of Studies in Chemistry held at 11.00 A.M on 13-10-2023 in the Department of Chemistry.

Dr .G.Giriprasad *Presiding*

Members Present:

- 1)..... **Chairman** **HOD, Dept. of Chemistry,**
(Dr.G.Giri Prasad) **A.G. & S.G.S.Degree College,Vuyyuru.**

- 2)..... **University Nominee Assistant Professor,**
(Prof.D.Ramasekhar Reddy) **Dept. of Chemistry,Krishna University, MTM.**

- 3)..... **Academic Council Nominee** **HOD, Dept. of Chemistry,**
(Dr. S. Kalpana) **SDMS M College, Vijayawada.**

- 4)..... **Academic Council Nominee** **Lecturer in Chemistry,**
(Dr.. A. Indira) **G.D.C, Dumpagadapa.**

- 5)..... **Industrialist** **Manager, Q.A, Biophore india**
(Dr. G Raja) **Pharmaceuticals pvt ltd Hyd.**

- 6)..... **Student Nominee** **Lecturer in Chemistry,**
(Smt. M. Sowjanya) **ANR College Gudivada.**

- 7)..... **Member** **Lecturer in Chemistry,**
(Smt. M.V.Santhi) **A.GS.G.S.Degree College,Vuyyuru**

- 8)..... **Member** **Lecturer in Chemistry,**
(Sri. P.Suresh) **A.G. & S.G.S.Degree College,Vuyyuru.**

- 9)..... **Member** **Lecturer in Chemistry,**
(MS. M.Santhi) **A.G.& S.G.S.Degree College,Vuyyuru.**

- 10)..... **Member** **Rtd. Lecturer in Chemistry,**
(Sri K.Ramesh) **A.G.& S.G.S.Degree College,Vuyyuru.**

- 11)..... **Member** **Rtd.Lecturer in Chemistry,**
(Sri. J.Nageswara Rao) **A.G.& S.G.S.Degree College,Vuyyur**

Agenda for B.O.S Meeting

1. To recommend the syllabus and model paper for I semester of I Degree B.Sc., Chemistry for the Academic year 2023-2024.
2. To recommend the MDC syllabus and model paper for I semester of I Degree **B.Com & B.A** for the Academic year 2023-2024.
3. To recommend the SEC syllabus and model paper for I semester of first year degree of **B.Sc.,B.Com, B.A & B C A** for the Academic year 2023-2024.
4. To recommend the syllabus and model paper for III semester of II Degree B.Sc., Chemistry for the Academic year 2023-2024.
5. To recommend the SDC syllabus and model paper for III semester of II Degree B.Sc. Chemistry for the Academic year 2023-2024.
6. To recommend the syllabus and model papers for V semester of III Degree B.Sc. Chemistry for the Academic year 2023-2024.
7. To recommend the Guidelines to be followed by the question paper setters in Chemistry for I,III,V Semester – end exams.
8. To recommend the teaching and evaluation methods to be followed under Autonomous status.
9. suggestions regarding certificate course, seminars, workshops, Guest lecture to be organized.
10. Suggestions regarding Value added course
11. Recommend the panel of Examiners for practicals conducted at end of each semester to COE
12. Any other matter.

Chairman

RESOLUTIONS

1. It is resolved to follow the **syllabus of APSCHE (theory and activity) for I semesters of I B.Sc.** First paper for Chemistry major, Maths major, Physics major & Computer major for the Academic year 2023—2024

Paper title : **Essentials and Applications of Mathematical, Physical and Chemical Sciences**

- It is resolved to follow the **syllabus of APSCHE (theory and activity) for I semesters of I B.Sc.** Second paper for Chemistry major, Maths major, Physics major & Computer major for the Academic year 2023—2024

Paper title : **Advances in Mathematical, Physical and Chemical Sciences**

- It is resolved to follow the **syllabus of APSCHE (theory and activity) for I semesters of I B.Sc.** Botany major, Zoology major & Aqua major for the Academic year 2023—2024

Paper title : **Classical Biology**

2. It is resolved to follow the Multi disciplinary course (MDC) **syllabus of APSCHE (theory) for I semesters of B.COM ,B.A & B C A** for the Academic year 2023—2024

Paper title : **Principles of Chemical Sciences**

3. It is resolved to follow the Skill enhancement course (SEC) **syllabus of APSCHE (theory) for I**

semesters of first year degree of I B.Sc., B.COM B.A & B C A for the Academic year 2023—2024

Paper title : **Leadership Skills**

4. It is resolved to follow the **syllabus of APSCHE (theory and practical) for III semesters of II B.Sc.** for the Academic year 2023--2024.

5. It is resolved to follow the Skill development course (SDC) **syllabus of APSCHE (theory & activity) for III semesters of B.SC (,MCCs, MSCs MPCs)** for the Academic year 2023—2024

Paper title : **Environmental Audit**

6. It is resolved to follow the **syllabus of APSCHE (theory and practical) for V semesters of III B.Sc.** for the Academic year 2023--2024.

- It is resolved to introduce Spectrophotometry instead of water analysis. In **Unit-5 of Analytical methods in chemistry-1 of 2022-2023 for 2023-2024.**
- It resolved to follow the same syllabus of **second paper (Analytical methods in chemistry-2) of APSCHE (theory and practical) of 2022-2023 for this academic year 2023-2024 also.**

7. It is resolved to follow the **guidelines** to be followed by the question paper setters of Chemistry for I, III & V semesters of Degree B.Sc. for the Academic Year 2023-2024.

8.It is resolved to continue the following teaching and evolution methods for Academic year 2023-24

Teaching Methods:

➤ Besides the conventional methods of teaching, we use modern technology i.e. using of LCD projector to display on U boards etc, for better understanding of concepts.

➤ **Evaluation of a student is done by the following procedure:**

➤ **Internal Assessment Examinations:**

➤ Out of maximum 100 marks in each paper for I B.Sc, 30 marks shall be allocated for internal assessment. Out of these 30 marks, 20 marks are allocated for two announced tests (i.e.IA-1 & IA-2). Attendance-5marks & Assignment/Activity-5marks

➤ Out of maximum 100 marks in each paper for II B.Sc,30 marks shall be allocated for two internal assessment. Out of these 30 marks, 20 marks are allocated for announced tests (i.e.IA-1 & IA-2). Attendance-5marks & Assignment-5marks

➤ Out of maximum 100 marks in each paper for III B.Sc, 25 marks shall be allocated for two internal assessment. Out of these 25 marks, 15marks are allocated for announced tests (i.e.IA-1 & IA-2). Activity-5marks & Assignment-5marks

➤ Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student.

➤ Out of maximum 50 marks in MDC,SEC & SDC for I year & II year respectively 10 marks shall be allocated for internal assessment& attendance -5marks. 35 marks shall be allocated for semester end exams.

➤ **Semester – End Examination:**

➤ **I Semester end examinations will be conducting in objective mode.**

➤ The maximum marks for III,V- Semester – End examination of B.Sc shall be 70 & 75 marks respectively,the duration of each examination shall be 3 hours. Even though the candidate is absent for two IA exams /obtain Zero marks the external marks are considered (if the candidate gets 40 & 40) and the result shall be declared as “PASS”.

➤ Semester – End examinations shall be conducted in theory papers at the end of every semester, while in practical papers, these examinations are conducted at the end of ,III & V semesters for II & III B.Sc for 50 marks.(external-40marks & internal record-10marks)

9.Discussed and recommended for organizing certificate course, seminars, Guest lecturers, workshops to upgrade the knowledge of students, for the approval of the academic council.

10.It is resolved to planning the value added course. In thia academic year for II B.Sc students.

11.Discussed and empowered the Head of the department of Chemistry to suggest the panel of Examiners for practicals conducted at end of each semester to COE

12.NIL.



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF

ARTS & SCIENCE

Vuyyuru-521165

NAAC reaccredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper: Essentials and Applications of Mathematical, Physical and Chemical Sciences

Semester: I (60 Hr)

Course Code	23SCIT11	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to connect their knowledge of chemistry to daily life.
4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.
5. To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.
 - To understand the properties and structure of gaseous and liquid states.
 - To understand the properties of solutions.

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
Essentials and Applications of Mathematical, Physical and Chemical Sciences		
I	<p>Essentials of Mathematics</p> <p>Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems Statistical Measures: Mean, Median, Mode of a data and problems.</p>	9H
II	<p>Essentials of Physics:</p> <p>Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe.</p>	9H
III	<p>Essentials of Chemistry</p> <p>Definition and Scope of Chemistry- Importance of Chemistry in daily life - Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.</p>	9H
IV	<p>Applications of Mathematics, Physics & Chemistry</p> <p>Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis</p> <p>Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.</p> <p>Application of Chemistry in Industry and Technology: Chemical Manufacturing,</p>	9H

	Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.	
V	Essentials of Computer Science: Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications. Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection.	9H

Reference Books

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L.Agarwal, New age international Publishers
4. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
5. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
6. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
7. Physics for Technology and Engineering" by John Bird
8. Chemistry in daily life by Kirpal Singh
9. Chemistry of bio molecules by S. P. Bhutan
10. Fundamentals of Computers by V. Raja Raman
11. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson



A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS), VUYYURU.

(Accredited at “A” Grade by NAAC, Bangalore)

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

Provide students with a set of complex numbers in both rectangular and polar forms. They will plot the complex numbers on the complex plane and identify their properties

2: Trigonometric Ratios Problem Solving

Give students a set of problems that require the calculation of trigonometric ratios and their relations. Students will solve the problems using the appropriate trigonometric functions (sine, cosine, tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form. Students will perform vector addition and subtraction operations to find the resultant vectors. They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values. Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation). They will interpret the results and analyze the central tendencies and distribution of the data.

Unit II: Essentials of Physics

1. Concept Mapping

Divide students into groups and assign each group one of the topics. Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic. Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields. Provide the necessary materials, instructions, and safety

guidelines for conducting the experiment. Students will work in small groups to carry out the experiment, collect data, and analyze the results. After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

Unit III: Essentials of Chemistry

1. Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine, or environmental issues. Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.

2. Periodic Table Exploration

Provide students with a copy of the periodic table. Students will explore the periodic table and its significance in organizing elements based on their properties. They will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3. Chemical Changes and Classification of Matter

Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction. Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.

4. Biomolecules Investigation

Assign each student or group a specific biomolecular category, such as carbohydrates, proteins, fats, or vitamins. Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body. They can create informative posters or presentations to present their findings to the class.

Unit IV: Applications of Mathematics, Physics & Chemistry

1: Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry. Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that

integrates mathematics, physics, and chemistry principles. Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.

3. Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of mathematics, physics, and chemistry. Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

4. Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

Unit V: Essentials of Computer Science:

1. Identifying the attributes of network (Topology, service provider, IP address and band width of your college network).
2. Prepare a report covering network architecture.
3. Identify the types of malwares and required firewalls to provide security.
4. Latest Fraud techniques used by hackers.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.(Accredited at “A” Grade by NAAC, Bangalore)

MODEL PAPER

FIRST YEAR B.Sc., DEGREE EXAMINATION SEMESTER-I

Essentials and Applications of Mathematical, Physical and Chemical Sciences

Time: 3 hours MODEL PAPER

Maximum Marks:

➤ I Semester end examinations will be conducting in objective mode.



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vuyyuru-521165

NAAC reaccredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

**Title of the Paper: Advances In Mathematical, Physical And Chemical
Sciences**

Semester: I (60 Hr)

Course Code	23SCIT12	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.
2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nonmaterial's and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.
4. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.
5. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.
6. Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of transmission media, such as wired (e.g. copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite).

Syllabus

Unit	Learning Units	Lecture Hours
Advances in Mathematical, Physical and Chemical Sciences		
I	<p>Advances in Basics Mathematics</p> <p>Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule</p> <p>Integration: Integration as a reverse process of differentiation – Basic methods of integration Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices –Transpose of a matrix and determinants</p>	9H
II	<p>Advances in Physics</p> <p>Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.</p>	9H
III	<p>Advances in Chemistry</p> <p>Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method.</p>	9H
IV	<p>Advanced Applications of Mathematics, Physics & Chemistry</p> <p>Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine, Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics, Application of medical physics: Radiation Therapy, Nuclear medicine</p> <p>Solid waste management, Environmental remediation- Green Technology, Water treatment.</p>	9H
V	<p>Advanced Applications of computer Science :</p> <p>Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.</p>	9H

Reference Books

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara.
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by
10. Dimitris C. Lagoudas
11. Nano materials and applications by M.N.Borah
12. Environmental Chemistry by Anil.K.D.E.
13. Digital Logic Design by Morris Mano
14. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, such as slope-intercept form, point-slope form, or general form. Students will explore the properties and characteristics of straight lines, including their slopes, intercepts, and point of intersection.

2. Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications, such as analyzing rates of change or optimizing functions.

3. Integration Exploration

Students will explore the concept of integration as a reverse process of differentiation and apply basic methods of integration, such as the product rule, substitution method, or integration by parts.

Students can discuss the significance of integration in various fields, such as physics and chemistry.

4. Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrix multiplication, and matrix transpose. Students can apply their knowledge of matrices to real-world applications, such as solving systems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1. Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials. Students will analyze the case studies, identify the challenges or problems presented, and propose innovative solutions based on the recent advances in the respective field. They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2. Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials. They will identify a specific research question or problem to investigate and design an experiment accordingly. Students will collect and analyze data, interpret the results, and draw conclusions based on their findings. They will discuss the implications of their experimental results in the context of recent advances in the field.

3. Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials. Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic. For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target. For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.

Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems. Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health. Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact. Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants. For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater. Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.

3. Group Project

Assign students to work in groups to develop a project related to one of the topics. The project could involve designing a computer-aided drug delivery system, developing a nano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.

Students will develop a detailed project plan, conduct experiments or simulations, analyze data and present their findings and recommendations. Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS,

1: Mathematical Modeling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm. Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques. They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2. Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modelling in nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment. Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach. Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field. Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment. The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices. Students will plan and execute their project, apply mathematical

modelling techniques, analyze the results, and present their findings and recommendations. Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

1. Students must be able to convert numbers from other number system to binary number systems
2. Identify the networking media used for your college network
3. Identify all the networking devices used in your college premises.

A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE Vuyyuru-521165

NAAC reaccredited at “A” level Autonomous -ISO 9001 – 2015 Certified

**Title of the Paper: ADVANCES IN MATHEMATICAL, PHYSICAL AND
CHEMICALSCIENCE - MODEL PAPER**

➤ I Semester end examinations will be conducting in objective mode.



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vuyyuru-521165

NAAC reaccredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

Title Of The Paper: Introduction To Classical Biology

Semester: I (60)hr

Course Code	23CBLT01	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity
2. Understand the plant anatomical, physiological and reproductive processes.
3. Knowledge on animal classification, physiology, embryonic development and their economic importance.
4. Outline the cell components, cell processes like cell division, heredity and molecular processes.
5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Syllabus

Unit	Learning Units	Lecture Hours
INTRODUCTION TO CLASSICAL BIOLOGY		
I	<p>Introduction to Systematics, Taxonomy and Ecology.</p> <p>1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.</p> <p>1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.</p> <p>1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.</p> <p>1.4. Pollution and climate change</p>	9H
II	<p>Essential of ofbotany</p> <p>2.1. The classification of plant kingdom.</p> <p>2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).</p> <p>2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.</p> <p>2.4 Mushroom cultivation, floriculture and landscaping.</p>	9H
III	<p>Essentials of Zoology</p> <p>3.1. The classification of Kingdom Animalia and Chordata.</p> <p>3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders</p> <p>3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)</p> <p>3.4 Economic Zoology – Sericulture, Apiculture, Aquaculture</p>	9H
IV	<p>Cell biology, Genetics and Evolution</p> <p>4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.</p> <p>4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.</p> <p>4.3. Central Dogma of Molecular Biology.</p> <p>4.4. Origin of life</p>	9H
V	<p>Essentials of chemistry</p>	9H

	<p>5.1. Definition and scope of chemistry, applications(Food,Medicine,Cosmotics,House hold,Soaps&Detergents) of chemistry in daily life.</p> <p>5.2. Branches of chemistry(Inorganic,Organic,Physical,Analytical &Environmental)</p> <p>5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogenbonds.</p> <p>5.4.Green chemistry- Importance&Principles of Green chemistry</p>	
--	---	--

5.4. References

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.
2. Pandey B.P., 2001. The textbook of botany Angiosperms. 4th edition. S. Chand publishers, New Delhi, India.
3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. S. Chand publishers, New Delhi, India.
4. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.
6. Sathanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
8. Karen Timberlake, William Timberlake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.

ACTIVITIES:

1. Make a display chart of life cycle of nonflowering plants.
2. Make a display chart of life cycle of flowering plants.
3. Study of stomata
4. Activity to prove that chlorophyll is essential for photosynthesis
5. Study of pollen grains.
6. Observation of pollen germination.
7. Ikebana.
8. Differentiate between edible and poisonous mushrooms.
9. Visit a nearby mushroom cultivation unit and know the economics of mushroom cultivation.
10. Draw the Ultrastructure of Prokaryotic and Eukaryotic Cell

11. Visit to Zoology Lab and observe different types of preservation of specimens
12. Hands-on experience of various equipment – Microscopes, Centrifuge, pH Meter, Electronic Weighing Balance, Laminar Air Flow
13. Visit to Zoo / Sericulture / Apiculture / Aquaculture unit
14. List out different hormonal, genetic and physiological disorders from the society

**A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE Vuyyuru-
521165**

NAAC reaccredited at “A” level Autonomous -ISO 9001 – 2015 Certified

Title Of The Paper: Introduction To Classical Biology-- MODEL PAPER

➤ I Semester end examinations will be conducting in objective mode.



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF

ARTS & SCIENCE

Vuyyuru-521165

NAAC recredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : **PRINCIPLES OF CHEMICAL SCIENCES**

Semester: I (30 Hr)

Course Code	-----	Course Delivery Method	Class Room / Blended Mode
Credits	2	CIA Marks	15
No. of Lecture Hours / Week	2	Semester End Exam Marks	35
Total Number of Lecture Hours	30	Total Marks	50
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

I. Course Outcomes: At the end of the course the student will be able to-

1. Understand the structure of atom.
2. Identify the isotopes and isobars.
3. Define acids and bases and predict the nature of salts.
4. Explain ionic and covalent bonding.
5. Describe the importance of Chemistry in daily life.

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	Unit I: Matter, Atoms, Molecules & Nuclear Chemistry Classification of matter, Dalton atomic theory, Thomson Model, Rutherford Model, Bohr's model of atom, quantum numbers, electronic configuration, Aufbau Principle, Pauli's exclusion principle, Hund's rule. Isotopes-Isobars, Types of nuclear reactions a) Nuclear fission b) Nuclear fusion, Applications 1. Medical 2. Agriculture.	6 Hrs
II	Unit II: Elements, Classification and Chemical Bonding Classification of elements, a) based on atomic weight b) classification into metals, non-metals and metalloids, c) modern periodic law, Salient features of periodic table Octet rule, ionic bond, properties of Ionic compounds-covalent bond, properties of covalent compounds.	9hrs
III	Unit III: Acids, Bases, Salts, Chemistry in Daily life Definition, types and properties of Acids, Bases, Salts, strength of acids and bases, pH, Importance of Chemistry in daily life. (food, drugs, textiles, preservatives, soaps and detergents.)	10h

List of Reference Books:

1. Inorganic Chemistry by Puri and Sharma
2. Basic concepts of Inorganic Chemistry by D.N.Singh

Co-curricular activities:

Projects on Importance of Chemistry in food, drugs, textiles, preservatives, soaps and detergents.

A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF

ARTS & SCIENCE

Vuyyuru-521165

NAAC recredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : **PRINCIPLES OF CHEMICAL SCIENCES-MODEL PAPER**

Time: 2 Hours

Maximum marks: 35

Pass marks:16

SECTION-A

Answer any **THREE** Questions. Each question carries 5marks. $3 \times 5 = 15M$

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION-B

Answer any **TWO** Questions. Each question carries 10 marks.

$2 \times 10 = 20\text{Marks}$

- 7.
- 8.
- 9.
- 10



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE,

Vuyyuru-521165

NAAC reaccredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : **LEADERSHIP SKILLS**

Semester: I (30 Hr)

Course Code	-----	Course Delivery Method	Class Room / Blended Mode
Credits	2	CIA Marks	15
No. of Lecture Hours / Week	2	Semester End Exam Marks	35
Total Number of Lecture Hours	30	Total Marks	50
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

Learning Outcomes:

By successful completion of the course, students will be able to:

1. Develop comprehensive understanding of personality
2. Know how to assess and enhance one's own personality
3. Comprehend leadership qualities and their importance
4. Understand how to develop leadership qualities

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	Unit – I: Meaning of Personality – Explanations of Human Personality – Psychodynamic Explanations – Social Cognitive Explanation – Big Five traits of Personality	6 Hrs
II	Unit – II: Assessment of Personality - Projective & Self Report Techniques - Building Self- Confidence – Enhancing Personality Skill.	9hrs
III	Unit – III: Leadership Characteristics – Types of Leaders – Importance of Leadership – Leadership Skills – Building and Leading Efficient Teams – Leadership Qualities of Abraham Lincoln, Mahatma Gandhi, Prakasam Pantulu, Dr. B. R. Ambedkar & J.R.D. Tata	10h

List of Reference Co-curricular Activities Suggested:

1. Assignments, Group discussions, Quiz etc.,
2. Invited Lecture by a local expert
3. Case Studies (ex., on students behavior, local leaders etc.)

Reference Books:

- Girish Batra, Experiments in Leadership, Chennai: Notion Press, 2018
- Mitesh Khatri, Awaken the Leader in You, Mumbai: Jaico Publishing House, 2013
- Carnegie Dale, Become an Effective Leader, New Delhi: Amaryllis, 2012
- Hall, C.S., Lindzey. G. & Campbell, J.B Theories of Personality. John Wiley & Sons, 1998

A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, Vuyyuru-

521165

NAAC recredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : **LEADERSHIP SKILLS-MODEL PAPER**

Time: 2 Hours

Maximum marks: 35

Pass marks:16

SECTION-A

Answer any THREE Questions. Each question carries 5marks. 3X5=15M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION-B

Answer any TWO Questions. Each question carries 10 marks.

2X10=20Marks

- 7.
- 8.
- 9.
- 10



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vuyyuru-521165

NAAC reaccredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper: ORGANIC CHEMISTRY & SPECTROSCOPY

Semester: III (60 Hr)

Course Code	CHET31A	Course Delivery Method	Class Room / Blended Mode
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2022 - 23	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 0

Course out comes:

Topics will include structure, stereochemistry, nomenclature, synthesis, properties, and reactions of the major classes of organic compounds. A mechanistic approach is used in the course to explain the reactions of these compounds.

Spectroscopy is general term used for the instrumental process by which information about molecular structure is obtained through careful analysis of absorption, scattering or emission of electromagnetic radiation by compounds.

Learning Objectives:

1. Student will know the preparation, properties and reactions of halo alkanes, halo arenes and oxygen containing functional groups
2. Student Use the synthetic chemistry learnt in this course to do functional group transformations.

3. Will know the different types of carboxylic acids their preparations & properties
4. Knowing various applications of spectroscopy methods
5. Learn to apply spectroscopy to simple organic compounds

Course Outcomes:

At the end of this course, students should be able to:

CO1: Remember the preparations, properties and reactions of halo alkanes, halo arenes and oxygen containing functional groups.-**PO1**

CO2: Understand preparation, properties and reactions of carbonyl compounds -**PO1**

CO3: Apply preparation methods for carboxylic acids and their derivatives-**PO1**

CO4: Analyze various molecules and polyatomic molecules using different spectroscopy methods-**PO1, PO7**

CO5: Evaluate the functional groups of different organic compounds- **PO1, PO7**

CO6: Create applications of spectroscopy for various organic molecules- **PO1, PO7**

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	<p>Chemistry of Halogenated Hydrocarbons</p> <p>Alkyl halides: Methods of preparation and properties, nucleophilic substitution reactions– SN^1, SN^2 and SN^i mechanisms with stereo chemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination, Williamson's synthesis. Arylhalides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; $SNAr$, Benzyne mechanism. Relative reactivity of alkyl, allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.</p> <p>Alcohols & Phenols</p> <p>Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt Blanc Reduction; Oxidation of diols by periodic acid and lead tetra acetate, Pinacol- Pinacolone rearrangement; Lucas Reagent</p> <p>Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer-Tiemann and Kolbe's-Schmidt Reactions, Fries and Claisen rearrangements with mechanism;</p>	12 Hrs
II	<p>Carbonyl Compounds</p> <p>Structure, reactivity, preparation and properties; Nucleophilic additions, with $NaHSO_3$, Formation of alcohols, HCN, Grignard's Reagent ($Rmgx$), hemiacetals, Fehling's, Tollen's, 2,4-Di Nitro Phenyl hydrazine (2,4-DNPH) and formation of oximes Nucleophilic addition-elimination reactions with ammonia derivatives Mechanisms of Aldol and Benzoin condensation, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann halo form reaction and Baeyer Villiger oxidation, α-substitution reactions, oxidations and reductions (Clemmensen, Wolf-Kishner, with $LiAlH_4$ & $NaBH_4$). Addition reactions of α,β-unsaturated carbonyl compounds: Michael addition.</p> <p>Active methylene compounds: Keto-Enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.</p>	10 hrs
	Carboxylic Acids and their Derivatives	

III	<p>General methods of preparation, physical properties and reactions of mono carboxylic acids, effect of Substituents on acidic strength. Typical reactions of dicarboxylic acids, hydroxyl acids and unsaturated acids. Preparation and reactions of acid chlorides, anhydrides, esters and amides; Comparative study of nucleophilic substitution at acyl group-Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Reform at sky reactions and Curtius rearrangement Reactions involving H, OH and COOH groups-salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, de carboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.</p>	12 hrs
IV	<p>Molecular Spectroscopy: Interaction of electromagnetic radiation with molecules and various types of spectra; Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution. Vibrational spectroscopy: Classical equation of vibration, computation of force constant, Harmonic and an harmonic oscillator, Morse potential curve,vibrational degrees of freedom molecules, modes of vibration. Selection rules for vibrational transitions, Fundamental frequencies, overtones and hot bands. Electronic spectroscopy: Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules, effect of conjugation. Concept of chromophore. Bathochromic and hypsochromic shifts.Beer-Lambert's law and its limitations. Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.</p>	18 hrs
	Application of Spectroscopy to Simple Organic	

V	<p>Molecules Application of visible, ultraviolet and Infrared spectroscopy in organic molecules.</p> <p>Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α, β – unsaturated compounds.</p> <p>Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on $>C=O$ stretching absorptions).</p>	8 hrs
---	---	-------

Textbook:

1. B.S.Bhal, Arun Bhal Advanced Organic Chemistry, Ramnagar, New Delhi 2001
2. P K Bruice. Organic Chemistry by Bruice, Pearson Education, Patparganj, Delhi-2001
3. Jonathan Clyden, Nick Greaves, Organic Chemistry by Clyden, Oxford University press
4. William Kempf, Spectroscopy by William Kemp, Palgrave, USA-3rd edition
5. Y R Sharma, Elementary Organic Spectroscopy, S Chand, 4th revised edition.

Recommended Reference book:

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).

Course Delivery method: Face-to-face / Blended

Course has focus on:

Employability / Entrepreneurship

Websites of Interest:

1. <https://www.sydney.edu.au/science/chemistry/~george/halides.html>
2. [https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Organic_Chemistry_\(McMurry\)/17%3A_Alcohols_and_Phenols/17.00%3A_Introduction](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Organic_Chemistry_(McMurry)/17%3A_Alcohols_and_Phenols/17.00%3A_Introduction)
3. <https://nptel.ac.in/content/storage2/courses/104101005/downloads/LectureNotes/chapter%2010.pdf>
4. <https://www.khanacademy.org/science/organic-chemistry/carboxylic-acids-derivatives/formation-carboxylic-acid-derivatives-sal/v/fisher-esterification?modal=1>
5. <https://byjus.com/chemistry/infrared-spectroscopy/>
6. <https://www.lehigh.edu/~kjs0/carey-13.PDF>

Co-curricular Activities:

Continuous Evaluation: Monitoring the progress of student's learning Class Tests Work sheets and Quizzes Presentations, Assignments and Group Discussions.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at "A" Grade by NAAC, Bangalore)
SEMESTER-III
CHEMISTRY COURSE-III: ORGANIC CHEMISTRY & SPECTROSCOPY

Time: 3 hours

Maximum Marks: 70

Section-A

Answer all questions. Each carrying four marks

5x4=20

1. (a)-4M
(or)
(b) – 4M
2. (a)-4M
(or)
(b) – 4M
3. (a)-4M
(or)
(b) – 4M
4. (a)-4M
(or)
(b) – 4M
5. (a)-4M
(or)
(b) – 4M

SECTION-B

Answer all questions. Each carrying Ten marks

5x10=50

6. (a)-10M
(or)
(b) – 10M
7. (a)-10M
(or)
(b) – 10M
8. (a)-10M
(or)
(b) – 10M
9. (a)-10M
(or)
(b) – 10M
10. (a)-10M
(or)
(b) – 10M

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.**

(Accredited at "A" Grade by NAAC, Bangalore)

Title of the Paper

(ORGANIC PREPARATIONS AND IR SPECTRAL ANALYSIS)

Laboratory Course-III

Semester: III

Credits: 2

Hours Taught: 30 hrs. (2hr/W)

Max.Time : 2 Hours

Course Prerequisites (if any): Basics of Organic Preparations and IR Spectroscopy

Course Description: Preparation of different organic compounds using conventional, Green approach methods and IR spectral analysis for different functional groups

Course Objectives:

1. Student will know the safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately.
2. Dispose of chemicals in a safe and responsible manner
3. Create and carry out work up and separation procedures

Course Outcomes: At the end of this course, students should be able to:

CO1: How to calculate limiting reagent, theoretical yield, and percent yield

CO2: How to perform common laboratory techniques including reflux, distillation, recrystallization, vacuum filtration.

CO3: How to critically evaluate data collected to determine the identity, purity, and percent yield of products and to summarize findings in writing in a clear and concise manner

Syllabus

Course Details

Unit	Learning Units	Practical Hours
I	Organic preparations: i. Acetylation of one of the following compounds: amines (aniline, o-, m-, ptoluidines and o-, m-, p-anisidine) and phenols (β -naphthol, vanillin, salicylic acid) by any one method: a. Using conventional method. b. Using green approach ii. Benzoylation of one of the following amines (aniline, o-, m-, p- toluidines and o-, m-, p-anisidine) iii. Nitration of any one of the following: a. Acetanilide/nitrobenzene by conventional method b. Salicylic acid by green approach (using ceric ammonium nitrate).	20 Hr
II	IR Spectral Analysis IR Spectral Analysis of the following functional groups with examples a) Hydroxyl groups b) Carbonyl groups c) Amino groups d) Aromatic groups	10Hr

Text Book

Laboratory Manual

Course Delivery method: Demonstration of Practical

Course has focus on:

Employability / Entrepreneurship

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS), VUYYURU.

(Accredited at "A" Grade by NAAC, Bangalore)

Title of the Paper

(ORGANIC PREPARATIONS AND IR SPECTRAL ANALYSIS)

Laboratory Course-III

SCHEME OF VALUATION

- 1. INTERNAL MARKS- Record-10M**
- 2. EXTERNAL MARKS-40**

- Practical -30M**
- Viva questions = 10 M**

TOTAL = 50 M



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vuyyuru-

NAAC recredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : Environmental Audit

Semester: III (30 Hr)

Course Code	-----	Course Delivery Method	Class Room / Blended Mode
Credits	2	CIA Marks	15
No. of Lecture Hours / Week	2	Semester End Exam Marks	35
Total Number of Lecture Hours	30	Total Marks	50
Year of Introduction : 2023 - 24	Year of Offering: 2023 - 24	Year of Revision: -----	Percentage of Revision: 100

Learning Outcomes:

By successful completion of the course, students will be able to;

- 1. Understand the basic concepts Environmental health*
- 2. Learn and identify the industrial pollution*
- 3. Explain the highlights in the regulatory aspects of Environmental law and policy*
- 4. Understand the various phases of Environmental Audit*

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	<p>Industrial Pollution and its effects</p> <p>Climate – Weather and Air Pollution – Classification of water and water bodies – Water Quality Parameters – Water Pollution – Sources – Classification, nature and Toxicology of water pollutants. - Soil parameters –Soil pollution and impacts – Soil conservation</p>	6 Hrs
II	<p>Environmental Law & Policy:</p> <p>Highlights of the Acts, Institutional arrangements for: (1) The Water (Prevention & Control of Pollution) Act, 1974 amended in 1988; (2) The Air (Prevention and Control of Pollution) Act, 1981 amended in 1987; (3) The Water (Prevention and Control of Pollution) Cess Act, 1977 amended in 1991; (4) The Environment (Protection) Act, 1986; (5) The Public Liability Insurance Act, 1991; – Indian Policy Statement for abatement of Pollution, 1992.</p>	9hrs
III	<p>Environmental Audit - Scope & Requisites:</p> <p>Environmental Audit: Definition; Objectives; Scope, Coverage - GOI Notification on Environmental Audit - Benefits to Industry. Reporting Environmental Audit Findings - Importance of Environmental Audit Report to industry, public and the governments</p>	10h

Co-curricular Activities Suggested:

5h

1. Visit to understand Institutional arrangements and functioning of Pollution Control Boards.
2. Visiting different Ecosystems
3. **Soil analysis:** Determination of soil type and texture, pH, Soil Moisture, Nitrogen, Potassium and Phosphorous.
4. **Water analysis:** Determination of pH, Dissolved solids and suspended solids, Dissolved Oxygen, COD, BOD.
5. Assignments, Group discussion, Quiz etc.

Reference books and websites:

1. Environmental Education in India by K.R. Gupta
2. Environmental Legislation in India by K.R. Gupta
3. <https://parivesh.nic.in/>
4. <https://www.cpcb.nic.in/>

A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE Vuyyuru-

NAAC recredited at “A” level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper : Environmental Audit-MODEL PAPER

Time: 2 Hours

Maximum marks: 35

Pass marks:16

SECTION-A

Answer any THREE Questions. Each question carries 5marks. 3X5=15M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION-B

Answer any TWO Questions. Each question carries 10 marks.

2X10=20Marks

- 7.
- 8.
- 9.
- 10



A.G & S.G. SIDDHARTHA DEGREE COLLEGE OF

ARTS & SCIENCE

Vuyyuru-521165

NAAC recredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper: Analytical Methods in Chemistry-I

Semester: V

Academic year-2023-2024

Course Code	CHESET01	Course Delivery Method	Class Room / Blended Mode
Credits	3	CIA Marks	25
No. of Lecture Hours / Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction : 2023-24	Year of Offering: 2023-24	Year of Revision: -----	Percentage of Revision: 20

Course Outcomes:

Students after successful completion of the course will be able to:

CO1. Remember the basic concepts of .quantitative analysis data treatment, separation techniques and analysis of water (PO7)

CO2. Acquire knowledge on the concepts quantitative analysis data treatment, separation techniques and analysis of water (PO1, PO7)

CO3. Apply the conceptual knowledge gained in the areas of quantitative analysis data treatment, separation techniques and analysis of water in the chosen job role (PO1)

CO4. Analyse that how far the quantitative methods, data treatment methods separation techniques and Analysis of water (PO1)

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	<p>Quantitative analysis-1</p> <p>1. A brief introduction to analytical methods in chemistry</p> <p>2. Principles of volumetric analysis, concentration terms- Molarity, Normality, v/v, w/v, ppm and ppb, preparing solutions- Standard solution, primary standards and secondary standards.</p> <p>3. Description and use of common laboratory apparatus- volumetric flask, burette, pipette, beakers, measuring cylinders.</p>	8Hrs
II	<p>Quantitative analysis-2</p> <p>1. Principles of volumetric analysis: Theories of acid-base (including study of acid-base titration curves), redox, complexometric, iodometric and precipitation titrations-choice of indicators for the saturations.</p> <p>2. Principles of gravimetric analysis: precipitation, coagulation, peptization, co-precipitation, post precipitation, digestion, filtration, and washing of precipitate, drying and ignition.</p>	12 Hrs
III	<p>Treatment of analytical data</p> <p>Types of errors- Relative and absolute, significant figures and its importance, accuracy – methods of expressing accuracy, errors- Determinate and indeterminate and minimization of errors, precision-methods of expressing precision, standard deviation and confidence interval.</p>	8 Hrs
IV	<p>Separation techniques</p> <p>1. Solvent Extraction: Introduction, principle, techniques, factors affecting solvent extraction, Batch extraction,</p>	5 Hrs

	continuous extraction and counter current extraction. Synergism. Application-Determination of Iron (III). 2. Ion Exchange method: Introduction, action of ion exchange resins, applications	
V	Spectrophotometry Principle, Instrumentation: Single beam and double beam spectrometer, Beer- Lambert's law- Derivation and deviations from Beer-Lambert's law, applications of Beer- Lambert's law- Quantitative determination of Fe^{+2} , Mn^{+2} and Pb^{+2} . Determination of PK value of indicator, determination of Glucose in blood.	12Hrs

III References

1. Analytical Chemistry by Gary D.Christian, Purnendu K.Dasgupta and Kevin A.Schug, Seventh edition, Wiley.
2. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.
3. Text book of Environmental Chemistry and Pollution Control by S.S.Dara and D.D.Mishra, Revised edition, S Chand & Co Ltd.

Text Books:

1. Instrumental methods of chemical analysis by B K Sharma
2. Separation methods MN Sastry

Reference materials on the web/web links:

1. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Quantifying_Nature/Volumetric_Chemical_Analysis_\(Shiundu\)/14.1%3A_Sampling_and_Statistical_Analysis_of_Data](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.1%3A_Sampling_and_Statistical_Analysis_of_Data)
2. <https://vlab.amrita.edu/?sub=2&brch=190&sim=338&cnt=1>

IV Co-Curricular Activities:

a) Mandatory (Lab/field training of students by teacher (lab: 10 + field: 05) :

1.For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of calibration of pH meter, Strong acid vs strong base

titration using pH meter, determination of chloride ion, estimation of water quality parameters and estimation of Iron(II).

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

2. For Student: Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/project work Report: 05.

4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students' by related industrial experts.

2. Assignments, Seminars and Quiz (on related topics).

3. Visits to facilities, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts.

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at "A" Grade by NAAC, Bangalore)**

Model Paper

SEMESTER – V	PAPER CODE : CHESET01
PAPER TITLE : Analytical Methods in Chemistry-I ACADEMIC YEAR-2023-2024	

Time: 3Hours

Maximum marks: 75

Minimum marks: 30

SECTION-A Short answer questions (25 Marks: 5x5)

Answer any Five questions. Each carries 5 marks.

At least 1 question should be given from each unit

1. Explain the preparation of v/v based with suitable examples-L2
2. Discuss the significance of quantitative analysis in Chemistry-L2
3. Explain the need of drying the precipitate in gravimetric analysis-L2
4. Discuss the principal involved in Idometric titrations-L2
5. Define accuracy and explain the methods of expressing accuracy-L2
6. Discuss the principal and theory involved in solvent extraction-L1
7. Illustrate the importance of significant figures in qualitative analysis-L3
8. Explain the quantitative determination of Pb^{+2} by spectrophotometric methods-L3

SECTION-B (Total: 5x10=50 Marks)

9(a) Discuss the detail about the primary and secondary standards with suitable examples-L2
Or

9(b) Describe the role of the following apparatus in analytical chemistry I) Volumetric flask
II) Burette III) Pipette –L2

10(a) Elaborate the theory involved in complexometric and acid base titrations-L2
Or

10(b) Write a note on the following terms in gravimetric analysis I) Precipitation II) Digestion
III) Filtration-L2

11(a) Define error, discuss in detail about various types of errors encountered in quantitative analysis-L2
Or

11(b) Elaborate the methods used for minimization of errors-L2

12(a) Discuss the various factors which effect solvent extraction-L2
Or

12(b) Explain in detail about role of Ion exchange resins in separation of compounds-L2

13(a) Explain the role of spectrophotometry in the determination of PK value of an indicator-L2
Or

13(b) Give a detailed account on various factors responsible for deviation from Beer's-
Lambert's law-L2

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.**

(Accredited at "A" Grade by NAAC, Bangalore)

PRACTICAL SYLLABUS

Practical Paper – V

Analytical methods in chemistry-I

Practical syllabus

PAPER CODE : CHESEP01

ACADEMIC YEAR-2023-2024

Analytical methods in Chemistry-1-PRACTICAL SYLLABUS

(Skill Enhancement Course (Elective), Credits: 02)

Practical Hrs ;45 (3hr/W)

I Learning Outcomes: On successful completion of this practical course, student shall be able to:

CO1. Estimate Iron (II) using standard Potassium dichromate solution (PO1)

CO2. Learn the procedure for the estimation of total hardness of water (PO7)

CO3. Demonstrate the determination of chloride using Mohr's method (PO1, PO7)

CO4. Acquire skills in the operation and calibration of pH meter (PO1)

II Practical (Laboratory) Syllabus :(30hrs)

1. Estimation of Iron(II) using standard Potassium dichromate solution (using DPA indicator)

2. Estimation of total hardness of water using EDTA

3. Determination of chloride ion by Mohr's method

4. Study the effect on pH of addition of HCl/NaOH to solutions of acetic acid, sodium acetate and their mixtures.

5. Preparation of buffer solutions of different pH (i) Sodium acetate-acetic acid, (ii) Ammonium chloride-ammonium hydroxide.

6. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.

7. Determination of dissociation constant of a weak acid.

II Lab References:

1. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at “A” Grade by NAAC, Bangalore)
PRACTICAL SYLLABUS**

Practical Paper – V Analytical methods in chemistry-I Practical syllabus	PAPER CODE : CHESEP01 ACADEMIC YEAR-2023-2024
---	--

Analytical methods in Chemistry-1-PRACTICAL SYLLABUS
(Skill Enhancement Course (Elective), Credits: 02)
Practical Hrs ;45 (3hr/W)

SCHEME OF VALUATION

1.INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- **Practical -30M**
- **Viva questions = 10 M**

TOTAL = 50 M



A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VUYYURU.

NAAC reaccredited at "A" level

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper: Analytical Methods in Chemistry-2

Semester: V

Course Code	CHESET02	Course Delivery Method	Class Room / Blended Mode
Credits	3	CIA Marks	25
No. of Lecture Hours / Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction : 2022 - 23	Year of Offering: 2023- 24	Year of Revision: -----	Percentage of Revision: 0

Learning Outcomes: Students after successful completion of the course will be able to:

CO1. Remember the basic concepts of Chromatography like paper, TLC, Column, GC & HPLC (PO7)

CO2. Understand the significance of paper, TLC, Column, GC & HPLC in separation and identification of compounds (PO1, PO7) .

CO3. Apply the conceptual knowledge gained in the techniques of chromatography in separating and identifying the chemical compounds as and when required (PO1).

CO4. Analyse that how far one chromatographic technique is much use full in separation and identification of compounds over the other chromatographic technique (PO1, PO7).

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	<p>Chromatography-Introduction and classification (Marks weightage 10+5)</p> <p>Principle, Classification of chromatographic methods, Nature of adsorbents, eluents, R_f values, factors affecting R_f values.</p>	7 hr
II	<p>TLC and paper chromatography (Marks weightage 10+10+5+5)</p> <p>1. Thin layer chromatography: Principle, Experimental procedure, preparation of plates, adsorbents and solvents, development of chromatogram, detection of spots, applications and advantages.</p> <p>2. Paper Chromatography: Principle, Experimental procedure, choice of paper and solvents, various modes of development- ascending, descending, radial and two dimensional, applications.</p>	12 hr
III	<p>Column chromatography (Marks weightage 10+10+5)</p> <p>1. Column chromatography: Principle, classification, Experimental procedure, stationary and mobile phases, development of the Chromatogram, applications, factors affecting the column efficiency.</p> <p>2. Applications:- Separation of .Methylene Blue and Flurocene by column chromatography.</p>	10 Hr
IV	<p>Gas chromatography: (Marks weightage 10+5+5)</p> <p>Basic principles. Different types of GC techniques. Selection of columns and carrier gases. Instrumentation. Detectors-Thermal conductivity detector, Flame ionization detector, R_f values. Applications in the separation of amino acids & estrogens</p>	8 hr

V	<p>High Performance liquid chromatography (HPLC) (Marks weightage 10+10+5)</p> <p>Basic principles. Normal and reversed Phases. Selection of column and mobile phase. Instrumentation. Detectors- RID, UV detector R_f values. Applications in the separation, separation of anions, barbiturates, tropane alkaloids.</p>	8 Hr
----------	---	-------------

III References

1. Fundamental so Analytical Chemistry by F.James Holler, Stanley R Crouch, Donald M.Westand Douglas A.Skoog, Ninth edition, Cengage.
2. Analytical Chemistry by Gary D.Christian, Purnendu K.Dasgupta and KevinA.Schug, Seventh edition, Wiley.
3. Quantitative analysis by R.A.Day Jr. and A.L.Underwood, Sixth edition, Pearson.
4. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition/ Pearson.

Text Books:

1. Instrumental methods of chemical analysis by B K Sharma
2. Instrumental methods of chemical analysis by Gurudeep & Chatwal Anand

Reference materials on the web/web links:

1. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Instrumental_Analysis/Chromatography/Gas_Chromatography](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Instrumental_Analysis/Chromatography/Gas_Chromatography)
2. <https://lab-training.com/hplc-high-performance-liquid-chromatography/>

VI Co-Curricular Activities:

a) Mandatory :(Lab/field training of students by teacher (lab: 10+ fields: 05):

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of determination of hardness of water, using the calorimeter and or Spectrophotometer, preparation of TLC plate, identification of spots in TLC and Paper chromatographic techniques, loading of column, selection of solvent system, separation of amino acids and dyes mixture using chromatographic techniques.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

2. For Student: Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the chromatographic techniques used for the separation of compounds. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/project work Report: 05.

4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.

2. Assignments, Seminars and Quiz (on related topics).

3. Visits to facilities, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts.

A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at "A" Grade by NAAC, Bangalore)
Model Paper

SEMESTER – V V	PAPER-	PAPER CODE : CHESET02
PAPER TITLE : Analytical Methods in Chemistry-2 Paper 7B ACADEMIC YEAR-2023-2024		

Time: 3Hours

Maximum marks: 75

Minimum marks: 25

SECTION-A Short answer questions (25 Marks: 5x5)

Answer any Five questions. Each carries 5 marks.

At least 1 question should be given from each unit

- 1) What is the basic principle involved in chromatography, explain nature of adsorbents-L1
- 2) How to prepare TLC plates-L3
- 3) Explain Ascending and descending techniques in paper chromatography-L2
- 4) Explain the classification of column chromatography-L2
- 5) Write briefly about experimental procedure for column chromatography-L2
- 6) Explain the schematic diagram of G.C-L2
- 7) Explain schematic diagram of HPLC-L2
- 8) Write experimental procedure of TLC.-L2

SECTION-B

(Total: 5x10=50 Marks)

- 9 (a) How do the chromatographic methods are classified? Explain any one-L2
Or
(b) Define Rf value, Explain factors effecting the Rf values-L2
- 10 (a) Discuss the applications of TLC.-L3
Or
(b) Explain the applications of paper chromatography-L3
- 11(a) Explain the factors effecting the column efficiency in CC-L2
Or
(b) Discuss the separation of methylene blue and fluorescein by C C.-L2
- 12 (a) Explain different types detectors used in G.C-L2.
Or
(b) Explain the separation of Amino acids by G.C-L2
- 13 (a) Explain the different detectors used in HPLC-L2
Or
(b) Explain the separation of Anions and Barbiturates by HPLC-L2

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at "A" Grade by NAAC, Bangalore)**

PRACTICAL SYLLABUS

Practical Paper – V Analytical methods in chemistry-2 Practical syllabus	PAPER CODE : CHESEP02 ACADEMIC YEAR-2023-2024
---	--

I Learning Outcomes: On successful completion of this practical course, student shall be able to:

CO1. Perform the separation of a given dye mixture using TLC (PO1)

CO2. Learn the preparation of TLC plates (PO1, PO7)

CO3. Demonstrate the separation of mixture of amino acids using paper chromatography (PO1)

CO4. Acquire skills in using column chromatography for the separation of dye mixture (PO7)

II Practical (Laboratory) Syllabus: (30hrs)

1. Separation of a given dye mixture (methyl orange and methylene blue) using TLC (using alumina as adsorbent).
2. Separation of different amino acids using paper chromatography.
3. Separation of given mixture of amino acids (glycine and phenyl alanine) using ascending paper chromatography.
4. Estimation of Fe^{+2} by using thiocyanate by calorimeter.
5. Separation of sugars using TLC
6. Verification of Beer Lambert's law. (Using potassium permanganate solution) using colorimeter /spectrophotometer.

III Lab References:

1. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.
2. Vogel A. I. Practical Organic Chemistry, Longman Group Ltd.
3. Bansal R.K. Laboratory Manual of Organic Chemistry, Wiley- Eastern.
4. Ahluwalia V. K. and Aggarwal R. Comprehensive Practical Organic Chemistry, University press.
5. Mann F.Gand Saunders B.C, Practical Organic Chemistry, Pearson Education.

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU.
(Accredited at "A" Grade by NAAC, Bangalore)**

PRACTICAL SYLLABUS

Practical Paper – V Analytical methods in chemistry-2 Practical syllabus	PAPER CODE : CHESEP02 ACADEMIC YEAR-2023-2024
---	--

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- **Practical-30M**
- **Viva questions = 10 M**

TOTAL = 50 M