



## A.D.M. COLLEGE FOR WOMEN

(Autonomous)

*Affiliated to Bharathidasan University*

(Nationally Accredited with "A" Grade by NAAC – 4<sup>th</sup> Cycle)

NAGAPATTINAM 611 001.

### LOCAL/NATIONAL/REGIONAL/GLOBAL RELEVANCE

#### PG DEPARTMENT OF CHEMISTRY

Programme: B.Sc Chemistry

Year: 2022-2023

| Course Code | Title of the Course | Local/Regional/<br>National /Global | Rationale   | Course Outcomes  | PSOs Addressed | Cognitive Level |
|-------------|---------------------|-------------------------------------|---|--|----------------|-----------------|
| QUA         | General chemistry I | Local                               | To study atomic structure, chemical bonding and molecular structure<br>To understand the basic properties of alkali metals.<br>To understand the basic properties and naming of organic compounds.<br>To learn various methods of preparation and | <ul style="list-style-type: none"><li>CO1: To understand the address of the electron and the concept of indicators and dilution.</li></ul>         | PSO 1,2        | U               |
|             |                     |                                     |   | <ul style="list-style-type: none"><li>CO2: To know the physical and chemical properties and uses of alkali metals, alkaline earth metals</li></ul> | PSO1,2,        | R               |

|     |                       |          |   |   |             |    |
|-----|-----------------------|----------|---|---|-------------|----|
|     |                       |          | <p>mechanism of reactions of Hydrocarbons.</p> <p>To study about colloidal state and macromolecules</p>   | <ul style="list-style-type: none"> <li>CO3: Recognize the basic practical skills for the synthesis of alkenes, alkynes and cycloalkanes.</li> </ul> | PSO1,2,5    | Ap |
|     |                       |          |   | <ul style="list-style-type: none"> <li>CO4: Predict the geometry and hybridization of molecules in organic chemistry.</li> </ul>                    | PSO1,2,5,   | C  |
|     |                       |          |   | <ul style="list-style-type: none"> <li>CO5: Apply the concept and uses of colloids in the applied field.</li> </ul>                                 | PSO1,2,4,   | An |
| QUD | General Chemistry III | Regional | <p>To learn about nature and formation of compounds of oxygen and Inter halogen compounds. To become aware of the fundamental aspects of stereochemistry and its influence chemical</p> | <ul style="list-style-type: none"> <li>CO1: To equip the learners with concepts of p block elements through comparative study.</li> </ul>           | PSO 1,2,3,4 | An |

|      |                          |        |   |  |             |    |
|------|--------------------------|--------|---|--|-------------|----|
|      |                          |        | properties.<br>To acquire knowledge about qualitative analysis. | <ul style="list-style-type: none"> <li>• CO2: Physical and chemical properties of Pseudo halogen and Interhalogen compounds.</li> </ul>  | PSO1,2,5    | U  |
|      |                          |        |   | <ul style="list-style-type: none"> <li>• CO3: Aware of the fundamental aspects of stereochemistry.</li> </ul>  | PSO1,2,5    | C  |
|      |                          |        |   | <ul style="list-style-type: none"> <li>• CO4: To understand the aspects of gaseous state</li> </ul>  | PSO 1,2     | An |
|      |                          |        |   | <ul style="list-style-type: none"> <li>• CO5: Learn about solids, their properties, close packing in crystals, use of X-rays in crystal structure determination and Properties of Liquid Crystal.</li> </ul> | PSO 1,2,3,5 | C  |
| QUS1 | Pharmaceutical Chemistry | Global | To learn the terminology and routes of administration of drug.  | <ul style="list-style-type: none"> <li>• CO1: To know the terminology in Pharmaceutical chemistry.</li> </ul>  | PSO 1,3,5   | U  |

|     |                    |          |   |  |   |  |
|-----|--------------------|----------|---|--|---|--|
|     |                    |          | <p>To learn the use of Indian Medicinal plants.</p> <p>To know about designation of drugs</p> <p>To know about common body ailment and treatment.</p> <p>To gain knowledge in vitamins, micronutrients and antioxidant.</p> | <ul style="list-style-type: none"> <li>• CO2: To understand the assay of drugs, administration of drugs.</li> <li>• CO3: To classify drugs based on biological and chemical methods.</li> <li>• CO4: To recognize the chemotherapy of some common diseases.</li> <li>• CO5: To learn depth concepts of nutrients and organic pharmaceutical aids.</li> </ul> | <p>PSO 1,2,3,5</p> <p>PSO 1,2,3,4,5</p> <p>PSO 1,3,4,5</p> <p>PSO 1,2,3,4,5</p> | <p>Ap</p> <p>Ap</p> <p>An</p> <p>U</p> |
| QUI | Physical Chemistry | Regional | <p>Students gain knowledge in Photochemistry and Group theory. Students understand the efficient way of converting work into energy and vice versa</p>  | <ul style="list-style-type: none"> <li>• CO1: Learn about Photochemistry</li> <li>• CO2: Predict the symmetry elements and symmetry operations</li> <li>• CO3: Apply the concept of Second law of thermodynamics</li> </ul>  | <p>PSO1,2,5</p> <p>PSO1,2,5</p> <p>PSO1,2,5</p>                                 | <p>Ap</p> <p>Ap</p> <p>Ap</p>          |

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|  |  |  | <p>from the thermo dynamic perspective. Students get to know the energy changes involved in the natural and the industrial processes- that are the applications of thermodynamics.</p> <p>Students understand the method of enhancing the efficiency of the certain industrial processes. Students learn about solutions, their types, colligative properties, effect of added salt and molecular weight determination.</p> | <ul style="list-style-type: none"> <li>• CO4: Know the partial molar quantities.</li> </ul>               | PSO1,2,3,5 | Ap |
|  |  |  |   | <ul style="list-style-type: none"> <li>• CO5: Recognize the component system using phase rule.</li> </ul> | PSO1,2,3   | R  |

|      |                   |        |  |   |              |    |
|------|-------------------|--------|--|---|--------------|----|
| QUS3 | Polymer chemistry | Global | <p>Students learn the chemistry of polymers. Students learn about Polymer structure, properties and methods of molecular weight determination of polymers.</p> <p>Students shall know the kinetics of polymers.</p> <p>Students gain knowledge about the natural and synthetic polymers.</p> <p>Students learn the constituents and importance of Plastics</p> | <ul style="list-style-type: none"> <li>• CO1: To help students explore about polymers and macromolecules.</li> </ul>                    | PSO1,2,3,4,5 | U  |
|      |                   |        |  | <ul style="list-style-type: none"> <li>• CO2: To assess the molecular weight of polymers, structure and its stereochemistry.</li> </ul> | PSO1,2,5     | An |
|      |                   |        |  | <ul style="list-style-type: none"> <li>• CO3: To recognize the kinetics of polymerization.</li> </ul>                                   | PSO1,2,5     | R  |
|      |                   |        |  | <ul style="list-style-type: none"> <li>• CO4: To distinguish the natural and synthetic polymer.</li> </ul>                              | PSO1,2,3,4   | Ap |
|      |                   |        |  | <ul style="list-style-type: none"> <li>• CO5: How to make plastics and resins.</li> </ul>   | PSO1,2,3,4   | Ap |
| QUS2 | Applied chemistry | Local  | Students learn about types and hardness techniques of water  | <ul style="list-style-type: none"> <li>• CO1: Develop an understanding about type of water.</li> </ul>                                  | PSO1,2,3,4,5 | U  |

|      |                        |        |  |   |            |    |
|------|------------------------|--------|--|---|------------|----|
|      |                        |        | <p>Students learn how to determine TDS, COD and BOD.</p> <p>Students understand about the application of Leather Chemistry.</p> <p>Students shall know about the physical and chemical properties of milk.</p> <p>Students understand about the constituent of dairy products.</p> | <ul style="list-style-type: none"> <li>• CO2: Experience in water analysis such as TDS, Total hardness, BOD and COD</li> </ul>                          | PSO1,2,5   | An |
|      |                        |        |  | <ul style="list-style-type: none"> <li>• CO3: Expertise in Leather manufacture and processing.</li> </ul>   | PSO1,2,5   | R  |
|      |                        |        |  | <ul style="list-style-type: none"> <li>• CO4: Learn about constituent physical and chemical properties of milk.</li> </ul>                              | PSO1,2,3,4 | Ap |
|      |                        |        |  | <ul style="list-style-type: none"> <li>• CO5: Skills in preparation of dairy products such as butter, ghee, ice-cream.</li> </ul>                       | PSO1,2,3,4 | Ap |
| QUE5 | Agricultural chemistry | Global | <p>Students learn about the composition and properties of soil.</p> <p>Students understand the source and properties of soil.</p>  | <ul style="list-style-type: none"> <li>• CO1: Students acquire the basic knowledge of Composition, Physical and Chemical properties of soil.</li> </ul> | PSO 1,3    | U  |

|  |  |  |  |   |             |    |
|--|--|--|--|---|-------------|----|
|  |  |  | <p>Micronutrient fertilizer. Students know the importance of Green manure.</p> <p>Students study about the pest management and its control.</p> <p>Students know the chemistry of Fungicide, Herbicide</p> | <ul style="list-style-type: none"> <li>• CO2: Students able to understand the secondary and micronutrient fertilizer.</li> </ul>            | PSO 1,2,3,5 | Ap |
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO3: Students can accumulate skills about green manure.</li> </ul>                                 | PSO1,2,3    | Ap |
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO4:Students should be able to apply the knowledge of Pest Management and control.</li> </ul>      | PSO 1,3,4,5 | U  |
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO5:Students should know the preparation and applications of fungicides and herbicides.</li> </ul> | PSO 1,2,3,5 | Ap |





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### LOCAL/NATIONAL/REGIONAL/GLOBAL RELEVANCE

### PG DEPARTMENT OF CHEMISTRY

Programme: M.Sc., Chemistry

Year: 2022-2023

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|-------------|---------------------|-------------------------------------|--|---|----------------|-----------------|
| PGQB        | Inorganic chemistry | Regional                            | To give a overview of the basic trends in inorganic chemistry.<br>Interpret collection of data in terms of common theory involved<br>The students will be able to understand | • CO1: Gain idea about the recent advances in Inorganic chemistry                 | PSO4,5         | U               |
|             |                     |                                     |  | • CO2: Identify the synthesis, structure and bonding of carbon-pi-donor complexes | PSO4,5         | AN              |
|             |                     |                                     |  | • CO3: Calculate magnetic moment & crystal field                                  | PSO5           | AP              |

|       |                                 |        |  |  |                           |                    |
|-------|---------------------------------|--------|--|--|---------------------------|--------------------|
|       |                                 |        | chemical bonds, bonding theories & basic molecular structure.  | <p>Stabilization energy of metal complexes.</p> <ul style="list-style-type: none"> <li>• CO4: Explain about different type of electron transfer Reaction (one electron transfer reaction &amp; direct electron transfer reaction) and factors affecting them.</li> <li>• CO5: Acquire knowledge about the basic principles of photo inorganic chemistry</li> </ul> | <p>PSO4</p> <p>PSO2</p>   | <p>U</p> <p>AP</p> |
| PGQE1 | Non conventional energy sources | Global | The chapter focus on application potential of community viable for developing renewable energy in India is to advance economic development, improve energy security and mitigate climate change. | <ul style="list-style-type: none"> <li>• CO1: Ensure the students understand the basic concept of energy.</li> <li>• CO2: Understand the solar devices such as solar cooker, solar water heater.</li> </ul>  | <p>PSO-1</p> <p>PSO-3</p> | <p>R</p> <p>U</p>  |

|       |                                    |        |  |   |       |    |
|-------|------------------------------------|--------|--|---|-------|----|
|       |                                    |        |  | <ul style="list-style-type: none"> <li>• CO3: Get a awareness about the wind energy and conversion to the generation of power.</li> </ul> | PSO-4 | AP |
|       |                                    |        |  | <ul style="list-style-type: none"> <li>• CO4: An introduction of composition of biogas and generation of power.</li> </ul>                | PSO-2 | U  |
|       |                                    |        |  | <ul style="list-style-type: none"> <li>• CO5: Study about the principles of geo Thermal and tidal power plant</li> </ul>                  | PSO-5 | AP |
| PGQE3 | Molecular modeling and drug design | Global | The main goal of this course is to gain some knowledge on modern approaches used in molecular modeling. Powerful computer based technology used to identify and design | <ul style="list-style-type: none"> <li>• CO 1:Identify the steps for designing new drugs, target identification and validation</li> </ul> | PSO-1 | R  |
|       |                                    |        |  | <ul style="list-style-type: none"> <li>• CO2:Acquire the capacity to apply the ideas of atomic displacement, Quantum</li> </ul>           | PSO-3 | U  |

|  |  |  |   |  |       |    |
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|  |  |  | <p>molecules for new medications greatly shortening the discovery computer based technology</p> | <p>and Molecular Mechanics, bonded interactions, hydrogen bondings and its significance in the application of drug development</p>   |       |    |
|  |  |  |   | <ul style="list-style-type: none"> <li>• CO3:Execute protein structure prediction and would be able to predict the derivatives of the molecular mechanics energy function</li> </ul>     | PSO-4 | AP |
|  |  |  |   | <ul style="list-style-type: none"> <li>• CO4:Understand the Molecular Dynamics simulation using the simple models, continuous potential sat constant temperature and pressure</li> </ul> | PSO-2 | U  |

|       |                         |        |   |   |       |    |
|-------|-------------------------|--------|---|---|-------|----|
|       |                         |        |   | <ul style="list-style-type: none"> <li>• CO5: Capable to present the docking strategies based on the ligand, receptor and de novo ligand design.</li> </ul>   | PSO-5 | AP |
| PGQE2 | Bio inorganic chemistry | Global | The main goal of the course is to provide basic training in this interdisciplinary area by applying previous general knowledge in chemistry to selected cases in bioinorganic chemistry | <ul style="list-style-type: none"> <li>• CO1: Understand the effect of various ligand field strengths on d-metal ions and find out ground state terms with their energies, microstates, degeneracy and microstate table for different transition metal ions and complexes.</li> </ul> | PSO-1 | R  |
|       |                         |        |   | <ul style="list-style-type: none"> <li>• CO2: Understand electronic spectra of complexes w.r.t. spin and orbital selection rules, various transitions, charge transfer spectra and luminescence spectra with LASER application.</li> </ul>  | PSO-3 | U  |

|  |  |  |  |   |       |    |
|--|--|--|--|---|-------|----|
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO3: Know the magnetic properties of complexes and understand spin-only and effective magnetic moments, Zeeman effect, properties of complexes with A, E, and T terms.</li> </ul>  | PSO-4 | AP |
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO4: Understand of Bioinorganic Chemistry: Use of metals in biological systems, various aspects of coordination chemistry related to bioinorganic research, metallobio polymers, their structure, function, role of metal ion, etc.</li> </ul> | PSO-2 | U  |
|  |  |  |  | <ul style="list-style-type: none"> <li>• CO5: Get the knowledge of Biochemistry of metals like Na, K, Fe, Ca and Mn.</li> </ul>   | PSO-5 | AP |