



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE
(Re-accredited with B+ Grade by NAAC)
Tiruppattur - 630 211.

B. Sc. Chemistry Programme

Programme Outcome (POs) :

After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals. Also they expand the knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc. Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, professional school and the chemical industry like cement industries, agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc. Got exposures of a breadth of experimental techniques using modern instrumentation. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life. Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.



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Fundamental of Chemistry - 7BCH1C1:

Course Description:

This course covers fundamental principles and laws of chemistry. Topics include quantum mechanics, quantum numbers and electronic configurations of the atomic structure, periodicity, chemical reactions and chemical bonding. Laboratory experiments and computer-based exercises augment and reinforce the basic principles discussed in lecture as well as provide practical examples.

Course Objectives

- ❖ "Advanced Inorganic Chemistry", Sathyaprakash.
- ❖ "Inorganic Chemistry", Puri and Sharma
- ❖ Know the discovery of electron, proton and neutron and their characteristics.
- ❖ To understand the nature of electromagnetic radiation and quantum theory.
- ❖ To understand the periodic law and significance of atomic number and electronic configuration as the basis for periodic classification.
- ❖ To classify elements into s, p, d and f blocks and learn their main characteristics.
- ❖ To understand the concept of organic reaction mechanism.
- ❖ To recognize the type of organic reactions
- ❖ To describe the term - paramagnetic, diamagnetic and ferromagnetic substances.

Course Outcome (COs)

- ❖ The above two books are prescribed texts for first two semesters.
- ❖ Apply the fundamental principles of measurement, matter, atomic theory, chemical periodicity, chemical bonding, general chemical reactivity and solution chemistry to subsequent courses in science.

Inorganic and Organic Volumetric Analysis Practical-I 7BCH1P1

Course Description:

This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques including volumetric analysis. This course is not open to Chemistry or Analytical and Testing Sciences major students.

Course Objectives

Experimental practice of quantitative volumetric analysis. The objective of the titration is the determination of the concentration or the mass of the minimum formula from the titrated chemical material composing a pure liquid or a solution. The main objective of volumetric analysis is to determine the amount of a substance in a given sample. When dealing with volumetric analysis the concept of concentration cannot be avoided. Molarity i.e. moles per litre or decimeter is widely used unit of concentration.

Course Outcome (COs)

Upon successful completion students should be able to:

Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.



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Physical Chemistry -I [7BCH2C1]

Course Description:

The course covers the basic physical principles that are the foundation of essentially all materials and biological chemistry. Topics include gaseous state, behavior of real gases, surface chemistry and chemical equilibrium.

Course Objectives

- ❖ Principles of Physical Chemistry", B.R.Puri, L.R.Sharma and M.S.Pathania
- ❖ "Physical Chemistry", N.Kundu and SN.Jain
- ❖ To apply gas laws in various real life situations.
- ❖ To differentiate between gaseous state and vapour.
- ❖ To study the laws of equilibrium.
- ❖ To understand various types of colloids and its applications

Course Outcome (COs)

Upon successful completion students should be able to:

- ❖ State and apply the laws of thermodynamics; perform calculations with ideal and real gases; design practical engines by using thermodynamic cycles; predict chemical equilibrium and spontaneity of reactions by using thermodynamic principles.
- ❖ To apply the concepts of colloids and gels
- ❖ To learn depth knowledge about liquid states.

Inorganic Chemistry-I [7BCH2C2]

Course Description:

This course is an introduction to modern inorganic chemistry. Topics include principles of structure, bonding, and chemical reactivity with application to compounds of the main group and transition elements, including organometallic chemistry, solid state chemistry, metallurgy and nuclear chemistry.

Course Objectives

- ❖ Advanced Inorganic Chemistry", R.D.Madan
- ❖ To identify mode of occurrence and describe isotopes of hydrogen.
- ❖ To understand the preparation and uses of ozone and hydrogen peroxide.
- ❖ To explain the term mineral ore concentration, roasting etc.,
- ❖ To know the types of nuclear reactions and its applications.

Course Outcome (COs)

Upon successful completion students should be able to:

- ❖ The above two books are prescribed texts for first two semesters.
- ❖ the bonding fundamentals for both ionic and covalent compounds, including electro negativities, bond distances and bond energies using MO diagrams and thermodynamic data.
- ❖ Predicting geometries of simple molecules
- ❖ The fundamentals of the chemistry of the main group elements, and important real world applications of many of these species



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Environmental Studies [7BES2]

Course Description:

Environmental science is the study of patterns and processes in the natural world and their modification by human activity. To understand current environmental problems, we need to consider physical, biological and chemical processes that are often the basis of those problems. This course will give you the skills necessary to address the environmental issues we are facing today by examining scientific principles and the application of those principles to natural systems. This course will survey some of the many environmental science topics at an introductory level, ultimately considering the sustainability of human activities on the planet.

Course Objectives

- ❖ To consider how the natural and built environments shape and are shaped by multiple socio-cultural and political factors.
- ❖ To think across and beyond existing disciplinary boundaries, mindful of the diverse forms of knowledge and experience that arise from human interactions with the world around them.

Course Outcome (COs)

- ❖ The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective. Students:
- ❖ Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- ❖ Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- ❖ Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- ❖ Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- ❖ Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- ❖ Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- ❖ Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and/or practitioners.



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Core -V Organic Chemistry -I [7BCH3C1]

Course Description:

Students continue their study of organic chemistry by discussing aromatic compounds, aldehydes and ketones, carboxylic acids and their derivatives, and organic nitrogen compounds. Synthesis using carbanion and hydrocarbons, oils and fats emphasized. Students also explore the chemistry of various organic compounds found in biological systems: carbohydrates, amino acids, proteins and peptides, and nucleic acids.

Course Objectives

After studying this, the students will be able to:

- ❖ Discuss electrophilic and nucleophilic in aromatic compounds.
- ❖ Difference between activating and deactivating groups.
- ❖ Correlate the preparation of types of phenol.
- ❖ Explain the mechanism of phenol.
- ❖ Study about the chemistry of Aromatic aldehyde, aromatic ketones and acids.
- ❖ Study about the chemistry of aromatic sulphonic acid and Nitro compounds.
- ❖ Calculate the saponification, Iodine and acid value for acids and fats.

Course Outcome (COs)

Working through this course, students are expected to apply their knowledge to problem-solve, deduce structures, and synthesize simple organic molecules using the studied reactions. Relationships between organic chemistry and other disciplines are noted.

Inorganic and Organic qualitative analysis Practical-II [7BCH3P1]

Course Description:

This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques to analyze organic compounds including volumetric analysis. This course is not open to Chemistry or Analytical and Testing Sciences major students

Course Objectives

⊖ Experimental practice of quantitative and qualitative analysis. ⊖ The objective of the titration is the determination of the concentration or the mass of the minimum formula from the titrated chemical material composing a pure liquid or a solution. ⊖ The main objective of volumetric analysis is to determine the amount of a substance in a given sample. When dealing with volumetric analysis the concept of concentration cannot be avoided. Molarity i.e. moles per litre or decimeter is widely used unit of concentration.

Course Outcome (COs)

Upon successful completion students should be able to:

⊖ Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations



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Course Description:

[7NME3C] Employability Skills

Course Objectives

Course work will emphasize individual skill assessments, interpersonal communication skills, workplace responsibilities, teamwork skills, safety issues, and personal management skills for the workplace.

Course Outcome (COs)

- ❖ To value clarification and matching assessment skills into employment
- ❖ To long term and short term goals
- ❖ To dealing with barriers to employment
- ❖ To decision-making strategies
- ❖ To setting priorities in work and personal life
- ❖ To factors that contribute to confidence and self-esteem
- ❖ To communicating effectively with employers, supervisors, and co-workers
- ❖ To teamwork approach to completing tasks
- ❖ To strategies for handling stress
- ❖ To appropriate clothing choices for interviews and the work site

Course Description:

[7SBS3A1] Competitive examination skills

The course aims to help participants develop their English language skills , particularly those planning to appear for competitive exams that test their English language abilities. During a span of 30 hours, students will be exposed to material that facilitates aspects of grammar, writing and vocabulary

Course Objectives

- ❖ To know the pattern of Various Examinations.
- ❖ To get the information about the exams conducted for the entry into jobs.
- ❖ To become aware about the various soft skills.
- ❖ To use the time effectively.
- ❖ To become aware about the goals of life

Course Outcome (COs)

Upon successful completion students should be able to: Apply the knowledge to attend the various examinations, soft skills and time effectively



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[7SBS3A2] Executive Skills

Course Description:

This course is designed to develop Mathematical aptitude, Scientific temperament, Logical thinking, Reasonings skills & Problem solving skills of the student and prepare them for future competitive examinations while they are studying in the school to take early lead in competitive scenario. This course focus on developing student's Intelligence quotient (IQ), & competitive quotient (C.Q.) at the early stage of learning so that each young student achieve success in school/board examination as well as in various scholarship and competitive examinations to ensure a grand successful career

Course Objectives

The High Potentials Leadership Program provides you with strategies to handle the formidable challenges associated with moving into new and increasingly more complex leadership roles. You will gain a better understanding of your own approach to leadership and acquire new ideas to optimize and sustain your potential.

Course Outcome (COs)

- ❖ You will leave the program with fresh perspectives and tangible action plans for taking charge and inspiring leadership throughout your organization. Specifically, you will be better prepared to: Page 14 of 66
- ❖ Understand, recognize, and foster the right leadership qualities in yourself and others
- ❖ Stay on the fast track, while dealing with new responsibilities and operating contexts
- ❖ Manage organizational politics and build relationships to achieve both professional and personal goals
- ❖ Receive – and deliver – feedback with grace
- ❖ Lead effectively through situations involving conflict
- ❖ Balance your personal leadership style with the demands of the organization without compromising your principles
- ❖ Create opportunities for personal reflection amid day-to-day issues and crises of management
- ❖ Spot and develop the next class of high-potential leaders within the organization



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[7SBS3A3] Disaster Management

Course Description: Emergency Management Course Descriptions. The history and development of emergency management as a professional field of study will be reviewed along with an exploration of the four phases of emergency management (preparedness, mitigation, response, recovery).

Course Objectives

- ❖ To provide students an exposure to disaster, their significance and types.
- ❖ To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- ❖ To gain a preliminary understanding of approaches of disaster risk reduction.
- ❖ To enhance awareness of institutional processes in the country

Course Outcome (COs)

Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters. Capacity to manage the Public Health aspects of the disasters.

Extension Activities [7BEA3]

Course Description:

The students understand the role of Practice national integration and social harmony.

Course Objectives

- Understand the community in which they work
- Understand themselves in relation to their community
- Identify the needs and problems of the community and involve them in problem solving process
- Develop among themselves a sense of social and civic responsibility

Course Outcome (COs)

- ❖ Identify and apply art and design elements, principles, and terminology in the creation and improvement of work.
- ❖ Demonstrate effective use of media and techniques while creating works of art and/or design.
- ❖ Express themselves aesthetically and/or creatively while making works of art and /or design.
- ❖ Identify visual strengths and weaknesses to promote aesthetic resolution and clear intentions in works of art and/or design.
- ❖ Distinguish between subjective and objective assessment through critique of art/design work.
- ❖ Demonstrate inventiveness through the use of problem-defining and problem-solving processes and skills.
- ❖ Identify and apply sustainable art and design practices in their chosen media



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Physical Chemistry-II - 7BCH4C1

Course Description:

This course is aimed to provide the students with a solid understanding of all the fundamental concepts physical chemistry necessary for the study of the more advanced or specialized courses that follow. The topics discussed include Thermodynamics and Electrochemistry

Course Objectives

- ❖ To understand laws of thermodynamics.
- ❖ To know about the acid bases concept of Arrhenius, Lowry and Bronsted.
- ❖ To discuss the conductance and transferances

Course Outcome (COs)

Students will gain an understanding of:

- ❖ The application of mathematical tools to calculate thermodynamics.
- ❖ the relationship between microscopic properties of molecules with macroscopic thermodynamic observables the derivation of rate equations from mechanistic data
- ❖ the use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics the limitations and uses of models for the solution of applied problems involving chemical thermodynamic and kinetics.

Chemistry -II - [7BCH4C2]

Course Description:

This course is aimed to provide the students with a solid understanding of all the fundamental concepts inorganic chemistry necessary for the study of the more advanced or specialized courses that follow. The topics discussed include Halogens, per acids and per salts, transition elements, lanthanides, actinides and solid state chemistry.

Course Objectives

Inorganic Chemistry”, Puri and Sharma & “Advanced Inorganic Chemistry”, R.D.Madan

- ❖ To understand types and structure of halogen compounds.
- ❖ To understand types and structure of inorganic carbon compounds.
- ❖ To classify acids as permonosulphuric and disulphuric.
- ❖ To distinguish between intra and inter molecular hydrogen bonding.
- ❖ To explain extraction, properties and uses of transition elements.
- ❖ To understand the chemistry of transition metal oxide.
- ❖ To understand the positions of lanthanide and actinide in the periodic table.
- ❖ To correlate the optical and magnetic properties of lanthanide.

Course Outcome (COs)

Upon successful completion students should be able to:

- ❖ Describe bonding models that can be applied to a consideration of the properties of transition metal compounds.
- ❖ The students familiar about the inorganic halogen compounds, coordination compounds and transition elements.
- ❖ They get well exposure about solids.



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Accounting Skill- 7SBS4B1

Course Description:

This course is designed to analyze special accounting issues, which may include business combinations, partnerships, international accounting, estates, and trusts. Emphasis is on analyzing transactions and preparing working papers and financial statements.

Course Objectives

- ❖ Students will demonstrate their knowledge of the fundamental and technical concepts of accounting.
- ❖ Students will demonstrate critical-thinking and problem-solving skills.
- ❖ Students will demonstrate skills in oral and written communications.
- ❖ Students will demonstrate an awareness of their role in the global environment.
- ❖ Students will demonstrate an awareness of their own values.
- ❖ Students will demonstrate a sense of responsibility and a capacity for service.
- ❖ Students will demonstrate the ability to recognize when change is appropriate, to adapt to change as it occurs, and to take the lead in creating change
- ❖ Students will demonstrate an understanding of their personal interests, abilities, strengths, and weaknesses as they pertain to professional career fields.
- ❖ Students will demonstrate a basic understanding of career options available to them and will establish career objectives.

Course Outcome (COs)

- ❖ Recognize and understand ethical issues related to the accounting profession.
- ❖ Prepare financial statements in accordance with Generally Accepted Accounting Principles.
- ❖ Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting methods on the financial statements.
- ❖ Effectively define the needs of the various users of accounting data and demonstrate the ability to communicate such data effectively, as well as the ability to provide knowledgeable recommendations.
- ❖ Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures.
- ❖ Demonstrate an understanding of current auditing standards and acceptable practices, as well as the impact of audit risk on the engagement.
- ❖ Understand the audit process from the engagement planning stage through completion of the audit, as well as the rendering of an audit opinion via the various report options.
- ❖ Apply cost accounting methods to evaluate and project business performance.
- ❖ Demonstrate an understanding of the taxation of individual income.
- ❖ Apply appropriate judgment derived from knowledge of accounting theory, to financial analysis and decision making.
- ❖ The student will experience real-world learning and application of skills via their internship. Note: Specific outcomes will vary by assigned internship experience.



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Course Description:

This course introduces basic emergency medical care to students. The subject include preparatory, rescue measure like accident, burning, natural disaster, drowning, snake, animal, rodent bites.

Course Objectives

- Explain the first aid methods.
- Discuss the traffic rules and emergency steps to be taken on the spot.
- Assess the basic clinical lab tests like blood, urine, saliva and stool tests.
- Understand to do projects on locally available native treatments for various health problems

Course Outcome (COs)

- This course is about managing trauma, from minor injury to humanitarian emergencies, including injuries in women, children and the elderly, with the principal goal of improving quality of care and patient safety.
- Basic emergency resuscitation skills in adults and children .
- To make the students awareness to blood, eye ,organs, herbal plants and vegetables

Youth Red Cross [7SBS4B3]

Course Description:

The Red Cross is an international organisation meant for humanitarian services. It is a nonreligious, non-political and a non-sectarian international body. YRC is a part of the Indian Red Cross Society

Course Objectives

- ❖ To inculcate in the Youth of our country.
- ❖ An awareness on the care of their own health and that of others.

Course Outcome (COs)

Our Red Cross programs support educational curriculum outcomes in health, social sciences, and the humanities. Youth Symposium participants will also develop critical selfawareness and skills in decision making, communication, conflict management, empathy, critical thinking, and social action to promote healthy.

Course Description:

Value Education [7BVE4]

This course will involve lecture/discussion of values education; thrust as a challenge to Philippine Education, theoretical foundations in the study of values etc

Course Objectives To create an awareness to values among learners and help them adopt them in their lives

Course Outcome (COs)

Upon completion, students should be able to demonstrate the skills necessary to achieve . Value-education tries to achieve two goals. First to develop a critical ability to distinguish between essence and form or between what is of value and what is superficial, in life. Second, to develop commitment and courage to act on one's beliefs in real life situations. What makes it difficult is the fact that the ability is to be developed no



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Manavalakalai Yoga [7BMY4]

Course Description:

Manavalaikkalai Yoga for the younger generations to benefit physically, mentally, socially and spiritually from his teachings and practices.

Course Objectives

- ❖ To enable the student to have good health.
- ❖ To practice mental hygiene.
- ❖ To possess emotional stability.
- ❖ To integrate moral values.
- ❖ To attain higher level of consciousness.

Course Outcome (COs)

- ❖ Knowledge of classical and theoretical foundations of the field of Yoga Therapy
- ❖ Knowledge of biomedical systems from an integrative and holistic perspective, as needed for the practice of Yoga Therapy
- ❖ Ability to apply knowledge learned in this curriculum and in previous yoga teacher trainings to assess the needs of clients, to design and implement effective programs, and to assess the effectiveness of these programs
- ❖ Ability to effectively use yoga as a therapeutic modality through the integration of diverse approaches to this field
- ❖ Knowledge and ability to use professional conduct during the practice of Yoga Therapy
- ❖ Ability to use relationship-based approaches to catalyze positive change or transformation with clients
- ❖ Critical thinking skills and science-based literacy to advance the evolution of Yoga Therapy as an integrative health practice

Women's Studies [7BWS4]

Course Description:

Learning goal: Students will demonstrate knowledge of social, economic, political, intellectual and cultural contributions of women past and present

Course Objectives

1. describe the social, economic, political, intellectual or cultural contributions of one or more women
2. analyze scholarship, literature, art, music, dance, theatre, or film created by or performed by one or more women Learning goal: Students will develop an understanding of how gender combines with nationality, race and ethnicity, religion, social class, sexual orientation, and physical ability to shape the experiences of men and women, including themselves.
3. read and respond to feminist scholarship
4. examine the similarities and differences among women within and across cultures and at different historical moments
5. describe gender socialization and its consequences in a particular society
6. identify gender and sex-based inequalities in a particular society



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Course Description:

Organic Chemistry-II [7BCH5C1]

Students review the basic principles of chemical bonding as they apply to organic molecules and are introduced to the concepts of functional groups, nomenclature, stereochemistry, and reaction mechanisms. The systematic chemistry of alkanes, alkenes, alkynes, alkyl halides, alcohols, carboxylic acid, amines, ethers and dyes and pigments are discussed

Course Objectives

- ❖ "Organic Chemistry", P.L.Soni
- ❖ "Advanced Organic Chemistry", B.S.Bahl and Arun Bahl Page 21 of 66
- ❖ To learn about various methods of preparation and applications of hydrocarbons.
- ❖ To understand the mechanism of alkyl halides.
- ❖ To estimate no of hydroxyl groups and alkoxy group in alcohol and ether.
- ❖ To understand the term rectified spirit and methylated spirit.
- ❖ To explain the mechanism of few selected reactions of aldehyde and ketones.
- ❖ To describe the methods of preparation and reactions of acids.
- ❖ To know about the concepts of stereochemistry.
- ❖ To understand the difference between configuration and conformation.
- ❖ To describe the structure and properties of various types of carbohydrates.

Course Outcome (COs)

Students will gain an understanding of:

- ❖ the use of nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy for organic structure elucidation
- ❖ the fundamentals of electronic structure and bonding in conjugated and aromatic systems
- ❖ reactivity patterns of conjugated and aromatic molecules
- ❖ the fundamental electronic structure and bonding in carbonyl compounds
- ❖ substituent effects on pKa (in the case of carboxylic acids)
- ❖ the reactivity of carbonyl compounds with both hard and soft nucleophiles (carboxylic acids, aldehydes and ketones)
- ❖ the kinetics and thermodynamics of carbonyl condensation reactions
- ❖ h. the fundamental properties and reactivity of biologically important molecules (e.g. carbohydrates, amines and amino-acids)



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Course Description:

Physical Chemistry-III [7BCH5C2]

This course presents to students the physical concepts in photochemistry, phase rule, chemical kinetics and prerequisite to spectroscopic techniques in structure determination, applied spectroscopy and Group theory

Course Objectives

- ❖ To impart the students the knowledge on phase rule, its applications and alloys, their importance, composition and applications.
- ❖ To demonstrate the application of spectroscopic and electrochemical methods in mechanistic studies of photochemical reactions
- ❖ To make students familiar with a broad variety of photochemical systems and their applications.

Course Outcome (COs)

Students will gain an understanding of:

- ❖ The photoredox processes at the surface of solids. An introduction to the current theoretical models of electron transfer dynamics is provided.
- ❖ Defines the importance of Phase Diagrams in the field of materials science and engineering
- ❖ Explains the basic definitions and terms in a phase diagram
- ❖ Defines phase, equilibrium, component, degree of freedom and phase rule concepts.
- ❖ Relates this concept

Course Description:

Gravimetric estimations and Organic Preparation Practical-III [7BCH5P1]

By the end of this course, students should be able to: Handle organic chemicals in a safe and competent manner. Perform the standard techniques used in practical organic chemistry. Carry out an organic preparation following a prescribed procedure. Read and explain the information labels on chemical bottles.

Course Objectives

The course provides training in:

- ⊖ Recognise many functional groups and their reactivity

- ❖ Set up glassware and apparatus to conduct experiments in Organic Chemistry.
- ❖ Interpret data from a range of physical techniques to characterise Organic compounds.
- ❖ Present the results of a practical investigation in a concise manner.
- ❖ Recognise many fundamental bond forming reactions and how to apply them in synthesis
- ❖ Describe bonding models and appreciate how these impact on the properties of a simple molecule
- ❖ Apply curly arrow nomenclature to depict the mechanistic course of a reaction
- ❖ Appreciate when different reactions are likely to compete and ways to bias reactions towards a single outcome

Course Outcome (COs)

- ❖ Students will gain an understanding of:
 - ❖ How to calculate a limiting reagent, yield, and percent yield
 - ❖ How to maintain a detailed scientific notebook
 - ❖ How to critically evaluate data collected to determine the identity, purity, and yield of products.



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Course Description:

Analytical Chemistry [7BCHE1A]

Instrumental techniques like spectroscopy, flame emission and atomic absorption, solvent extraction and chromatography will be studied. This course forms the basis for advanced studies in instrumental analysis, environmental studies and industrial studies. Topics covered include laboratory hygiene, instrumental analysis and separation & purification techniques.

Course Objectives

- ❖ To provide a basic knowledge and understanding of essential chemical and physical principles for analytical chemistry.
- ❖ To introduce basic analytical techniques and practical aspects of classical chemical analysis. To solve problems related to chemical analysis and interpret analytical results.

Course Outcome (COs)

After examination the student should be able to: - Explain the theoretical principles and important applications of classical analytical methods within titration (acid/base titration, complexometric titration, redox titration), and various techniques within gravimetric and coulometric methods. - Explain the theoretical principles of selected instrumental methods within electroanalytical and spectrometric/spectrophotometric methods, and main components in such analytical instruments. - Explain the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques. - Assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance. - Performing risk assessment of chemical experiments and chemical analytical activity - Performing classical analytical experiments, and make observations and assessments of important factors that could affect the analytical result. - Be familiar with calculations in analytical chemistry, be able to calculate titration errors for method evaluation, and perform statistical evaluation of results from classical and instrumental chemical experiments and analyses. - Make scientific reports from chemical experiments and present the results in a transparent manner.



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Course Description:

Agricultural Chemistry[4BCHE1B]

Agricultural Chemistry is an introductory chemistry course. Students will receive an in-depth look at chemical and biochemical properties and processes, which are integral to soils, agriculture and the environment.

Course Objectives

- ❖ Understand basic concepts (including history of, resources needed, and the future of) production agriculture.
- ❖ Describe important historical developments in production agriculture.
- ❖ Understand factors influencing food security.

Course Outcome (COs)

- ❖ Students acquire the basic knowledge of inorganic, analytical, organic and biochemistry. ⌘ Student is able to understand the molecular mechanisms that regulate the activity of Agro ecosystem function
- ❖ Accumulate skills for scientific research work and agricultural works in the future.
- ❖ Demonstrate a comprehensive understanding of the fundamental principles and multidisciplinary concepts in the field of agriculture.

Course Description:

Industrial Chemistry [7BCHE2A]

The course is designed to teach you the essential skills and knowledge involved in industrial chemistry. The course content is wide ranging with limited detailed theory and includes some factual information that simply will need to be memorized. A key skill emphasized is problem solving, both quantitative and qualitative. The topic also cover the paints, pigments varnishes, ceramics, galss, cements, soaps, detergents, refractories, ferti;ozers, adhesives, enamels, explosives and different industries

Course Objectives

The specific objectives of Industrial Chemistry program are to:

- ❖ Make the students well-grounded in the principles and through knowledge of scientific techniques of industrial Chemistry.
 - ❖ Educate and train Chemists to acquire a meaningful picture of Chemical industries.
- ⌘ Prepare students for professional participation in Chemical industries so as to adapt themselves to jobs which are problem solving
- ⌘ Train students to be result-oriented in the chemical, petrochemical, biochemical and allied technological fields.

Course Outcome (COs)

Industrial Chemistry is designed to provide graduates with the skills, knowledge and learning tools required to carry out professional research, and development and production activities in the field of chemistry, including the following sectors: health, food, cosmetics, the environment and energy.



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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Tirupattur - 630 211.

B. Sc. Chemistry Programme

Course Description:

Medicinal Chemistry [7BCHE2B]

The course includes theoretical studies in the field of Medicinal Chemistry. It also includes physical chemical factors, diagnostic medical instruments such as ECG, EEG, CT, etc. Also, it includes disease and treatment.

Course Objectives

The main objectives of this master in medicinal chemistry are:

- ❖ Understanding of the basic biological and pharmacological interactions by using both natural products and total synthesis of bioactive molecules.
- ❖ Use of corresponding knowledge for the development of biologically and clinically active drugs.
- ❖ It will include advanced courses in natural products, organic synthesis, medicinal chemistry; fundamentals of cell biology, molecular biology, drug design, and analytical methods

Course Outcome (COs)

The main objectives of this master in medicinal chemistry are:

- ❖ Understanding of the basic biological and pharmacological interactions by using both natural products and total synthesis of bioactive molecules.
- ❖ Use of corresponding knowledge for the development of biologically and clinically active drugs.
- ❖ It will include advanced courses in natural products, organic synthesis, medicinal chemistry; fundamentals of cell biology, molecular biology, drug design, and analytical methods.



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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Tiruppattur - 630 211.

B. Sc. Chemistry Programme

Heritage and Tourism [4SBS5A5]

Course Description:

This course examines the development of cultural heritage tourism resources as primary or secondary destination products. Students examine the range of cultural and heritage assets that can become viable tourism attractions including museums, the performing arts, historic sites, etc

Course Objectives

The aim of the course is for students to understand the significance of culture and cultural heritage for tourism development. Religion is an important aspect of culture and the exploitation of religious- cultural heritage contributes to tourism development.

Course Outcome (COs)

On successful completion of the course students will be able to:

- ❖ Demonstrate a critical understanding of the relationships between culture, heritage and tourism.
- ❖ Describe cultural and heritage tourism policy, planning and management issues.
- ❖ Explain cultural sustainability and sustainable tourism principles and practices

Marketing and Sales Management [5SBS5A6]

Course Description:

The goal of the Sales Management course is to examine the elements of an effective sales force as a key component of the organization's total marketing effort. The course will extend student's understanding of marketing's reach and potential impact in achieving its overarching goals.

Course Objectives

Graduates of this program will be able to:

- Communicate effectively in a variety of organizational settings.
- Evaluate complex qualitative and quantitative data to support strategic and operational decisions.
- Apply problem solving and decision making frameworks that propose defensible solutions to organizational opportunities, challenges, change and risk

Course Outcome (COs)

The course is designed to provide students with an understanding of the processes involved in personal selling and sales management. The course examines the elements that enable a sales force to be an effective component of an organization's overall marketing strategy. The course will extend students' understanding of: the sales process, the relationship between sales and other organizational functions, the various types of sales force structures, customer relationship management (CRM), the use of technology to improve sales force effectiveness, and issues concerning recruiting, selecting, training, motivating, compensating, and retaining salespeople.



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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Tirupattur - 630 211.

B. Sc. Chemistry Programme

Urban Planning [5SBS5A7]

Course Description:

In this course you will acquire and develop and apply a range of urban design skills and professional knowledge. You will respond to a contemporary urban design brief focusing on a case study site. You will develop urban design analyses and proposals that will be presented and critiqued. You will engage in independent as well as collaborative fieldwork, research, analysis and design activities to inform your ideas and proposals. You will be expected to demonstrate that you can work productively with others to establish processes and to allocate responsibilities and roles to address the design brief.

Course Objectives

- ❖ To introduce basic accounting principles, ethics in accounting and preparation of financial statements.
- ❖ To analyze the business problem by incorporating diverse perspective of accounting techniques and to develop competent decision skills in the areas of accounting

Course Outcome (COs)

Upon successful completion of this course, you will be able to:

- Apply a range of key urban design, research and problem solving skills to complex realworld situations
- Analyse a case study site, drawing on theoretical approaches and a range of available documents including plans, photographs and written documents
- Create and communicate urban design ideas and proposals to a wide audience using a range of presentation skills and media, including drawings
- Demonstrate effective interpersonal communication and project management skills both as part of a team and independently

Physical Chemistry Practical IV [7BCH6P1]

Course Description: These courses provide students with practical work related to the principles studied in Physical Chemistry I & II. This course is open to Chemistry majors only.

Course Objectives

- ❖ The course provides training in advanced physical chemistry laboratory techniques.
- ❖ The experiments are guided by demonstrators and are designed both to illustrate applications of theory covered in the Chemical Physics and lecture courses, and to introduce typical instrumentation.

Course Outcome (COs)

On successful completion of the course students will be able to:

1. Developed expertise relevant to the professional practice of chemistry
2. Developed an understanding of the breadth and concepts of physical chemistry
3. An appreciation of the role of physical chemistry in the chemical sciences and engineering
4. Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry
5. An understanding of methods employed for problem solving in physical chemistry



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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B. Sc. Chemistry Programme

Course Description:

These courses provide students with practical work related to the principles studied in Physical Chemistry I & II. This course is open to Chemistry majors only.

Course Objectives

- ❖ The course provides training in advanced physical chemistry laboratory techniques.
- ❖ The experiments are guided by demonstrators and are designed both to illustrate applications of theory covered in the Chemical Physics and lecture courses, and to introduce typical instrumentation.
- ❖ The investigation provides an introduction to research methods: a group of 3-4 students are given a theme or problem and some apparatus; they must devise, build and execute experiments using less guidance than for the standard experiments. Data analysis and structured report writing are key components of the course.

Course Outcome (COs)

On successful completion of the course students will be able to:

1. Developed expertise relevant to the professional practice of chemistry
2. Developed an understanding of the breadth and concepts of physical chemistry
3. An appreciation of the role of physical chemistry in the chemical sciences and engineering
4. Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry
5. An understanding of methods employed for problem solving in physical chemistry
6. Experience in some scientific methods employed in basic and applied physical chemistry
7. Developed skills in procedures and instrumental methods applied in analytical and practical tasks of physical chemistry
8. Developed skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments
9. Developed some understanding of the professional and safety responsibilities residing in working with chemical systems.



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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B. Sc. Chemistry Programme

Inorganic Chemistry III [7BCH6C1]

Course Description:

This course is aimed to provide the students with a solid understanding of all the fundamental concepts and physical principles in modern inorganic chemistry necessary for the study of the more advanced or specialized courses that follow. The topics discussed include coordination chemistry, organometallics chemistry, bioinorganic chemistry and material chemistry.

Course Objectives

- ❖ To understand the key features of coordination compounds, including: - the variety of structures. - oxidation numbers and electronic configurations. - coordination numbers. - ligands, chelates. - bonding, stability of complexes.
- ❖ To be able to use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds.
- ❖ To be able to describe the shapes and structures of coordination complexes with coordination numbers ranging from 4 to 12.
- ❖ To be able to describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them.
- ❖ To be able to recognize the types of isomers in coordination compounds.
- ❖ To be able to name coordination compounds and to be able to draw the structure based on its name.
- ❖ To become familiar with some applications of coordination compounds.
- ❖ To study about the concepts of Biochemistry and material chemistry.

Course Outcome (COs)

- Students will gain an understanding of:
- ❖ predicting geometries of simple molecules
 - ❖ the fundamentals of the chemistry of the main group elements, and important real world applications of many of these species
 - ❖ the use of group theory to recognize and assign symmetry characteristics to molecules and objects, and to predict the appearance of a molecule's vibrational spectra as a function of symmetry
 - ❖ the bonding models, structures, reactivity's, and applications of coordination complexes, boron hydrides, metal carbonyls, and organometallics
 - ❖ Apply the knowledge in biochemical reactions.



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Tirupattur - 630 211.

B. Sc. Chemistry Programme

Course Description:

Introduces to Carbohydrate, Natural products, Biochemistry, dyes organic chemistry spectroscopy and molecular rearrangements.

Course Objectives

- ❖ This course will give an introduction to modern spectroscopic techniques including time-resolved laser methods. Theory and application to chemical research problems on will be discussed, including mass spectrometry, ultraviolet and visible spectroscopy, infrared spectroscopy, Raman, fluorescence, nuclear magnetic resonance spectroscopy, time-resolved spectra including lifetime measurements, etc.
- ❖ Comprehension of principles of photochemistry and learning of current applications.
- ❖ The primary goal of this course is to make students aware of how chemical processes can be designed, developed and run in a sustainable way.
- ❖ Students acquire the competence to think of chemistry as a sustainable activity.

Course Outcome (COs)

- ❖ How to use their understanding of organic mechanisms to predict the outcome of reactions
- ❖ How to design syntheses of organic molecules
- ❖ How to determine the structure of organic molecules using IR and NMR spectroscopic techniques
- ❖ Students will demonstrate an advanced level of knowledge in Organic photochemistry. Improve their theoretical knowledge about chemical reactions which are carried out by light.
- ❖ the use of nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy for organic structure elucidation
- ❖ the fundamentals of electronic structure and bonding in conjugated and aromatic systems
- ❖ reactivity patterns of conjugated and aromatic molecules



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B. Sc. Chemistry Programme

Polymer Chemistry [7BCHE3A]

Course Description:

Polymer Chemistry is a course that introduces students to Polymer science, engineering and technology, where types of polymer, reactions to form polymer, polymerization mechanisms, structures, properties and applications.

Course Objectives

- ❖ The aim of the course is to familiarise students with electrochemical processes occurring in the solid state:
- ❖ The subject provides an introduction to polymer science with respect to synthesis, polymerization kinetics and network formation/gelation of macromolecules formed by step-growth and chain-growth polymerization.
- ❖ Polymer structure/conformation and transitions from liquid (melt, solutions) to solid (polymer crystals and -glass) states are discussed using equilibrium thermodynamics, kinetics and free volume considerations.
- ❖ Polymer solubility/miscibility and phase diagrams are determined using thermodynamic parameters. Molecular weight determination of polymers is shown using osmotic pressure, viscosimetry and size exclusion chromatography (SEC).

Course Outcome (COs)

The aim of the course is to familiarise students with electrochemical processes occurring in the solid state:

- ❖ The subject provides an introduction to polymer science with respect to synthesis, polymerization kinetics and network formation/gelation of macromolecules formed by step-growth and chain-growth polymerization.
- ❖ Polymer structure/conformation and transitions from liquid (melt, solutions) to solid (polymer crystals and -glass) states are discussed using equilibrium thermodynamics, kinetics and free volume considerations.
- ❖ Polymer solubility/miscibility and phase diagrams are determined using thermodynamic parameters. Molecular weight determination of polymers is shown using osmotic pressure, viscosimetry and size exclusion chromatography (SEC).
- ❖ An overview of mechanical and rheological properties of polymers is also given. Specialized synthesis for flow assurance industry.



ARUMUGAM PILLAI SEETHAI AMMAL COLLEGE

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B. Sc. Chemistry Programme

Material Chemistry and Nano Science[7BCHE3B]

Course Description:

This course will focus on nanomaterials, chemical synthesis and technological developments. This is a multidisciplinary module involving chemistry, physics and biology.

Course Objectives

Topics include: introduction to different classes of nanomaterials, including both inorganic and organic constituents; synthesis of nanomaterials , including chemical and physical vapor transport, solution chemistry, and nanofabrication methods; characterization of nanomaterials, including x-ray techniques, scanning probe ...

Course Outcome (COs)

Students will gain an understanding of:

- the historical evolution and current revolution that is nanoscience
 - the fundamental uniqueness of the chemical and physical properties of nanomaterials and their potential impact in science, engineering, medicine, and the environment
 - the interdisciplinary nature of nanoscience
 - top down and bottom up methods of nanomaterials preparation
 - the tools behind nanomaterials characterization (e.g., the scanning tunneling microscope)
 - futuristic concepts like nanorobots, nanorockets, and fantastic voyage-like submarines.
- These objectives are packaged with discussion sessions designed to enforce out-of-the-box thinking skills, teaming work, and communications

Project [7BCHEPR]

Course Description:

This course develops a foundation of concepts and solutions that supports the planning, scheduling, controlling, resource allocation, and performance measurement activities required for successful completion of a project.

Course Objectives

Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise. Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management. Demonstrate effective project execution and control techniques that result in successful projects. Conduct project closure activities and obtain formal project acceptance. Demonstrate a strong working knowledge of ethics and professional responsibility. Demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders.

Course Outcome (COs)

Manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders. Align the project to the organization's strategic plans and business justification throughout its lifecycle.



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B. Sc. Chemistry Programme

Fruit, vegetable preservation skills [7SBS6B4]

Course Description:

This course introduces students to the practice of food preservation in a time of energy descent. Topics include canning, dehydrating, fermenting, food preservation history and philosophical approaches associated with insuring food security.

Course Objectives

- Maintain momentum in current base programs in vegetable and fruit research.
- Identify major needs of the vegetable and fruit industry and form interdisciplinary teams.
- Promote the visibility of existing research programs and develop new programs.
- Develop new technology in vegetable and fruit research programs.
- Implement new strategies for funding research projects.
- Provide authoritative and credible technical information to consumer and producer clientele groups.
- Enrich graduate education by offering students the opportunity to interact with interdisciplinary research teams.

Course Outcome (COs)

Diets rich in fruit and vegetables are associated with better health status. A number of school-based programs have shown positive effects on children's dietary behaviors; some have focused broadly on nutrition, physical activity, and heart health whereas others have focused more specifically on fruit and vegetable consumption. Despite these successes, consumption of fruit and vegetables among adolescents is generally below recommended levels, supporting a need to identify effective strategies for promoting fruit and vegetable consumption, among other healthful dietary patterns.

Equipment handling skills for events [7SBS6B5]

Course Description:

This course introduces students to the practice of VCD/DVD handling, videography, PA system, Audio recording, LCD operations PPT and Photography

Course Objectives

This course will focus on

- To know about the basic electric tools.

- ❖ To learn about PA system and Audio recording.
- ❖ To discuss about VCD/DVD handling and Videography.
- ❖ To study about LCD operations and power-point presentation.
- ❖ To practice photography and image editing.

Course Outcome (COs)

- ❖ Students will gain an understanding of about the basic electric tools, PA System, Audio recording, VCD/DVD handling, Videography, LCD operations and power-point presentation, photography and image editing