

Annai Hajira Women's College

Melapalayam, Tirunelveli-05

Department of Chemistry

Syllabus 2017 - 2018

PO, PSO & CO's of Chemistry

UG-Programme – CBCS –SEMESTER PATTERN

Course Code: CH



Department of
Chemistry

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UG -Programme - Course Structure under CBCS

B.Sc. Chemistry

(Applicable to the candidates admitted from the academic year 2017-2018 onwards)

FIRST SEMESTER

Subject Code	Subject Title	Lecture Hours	LAB Hours	Credits
S1TL11	Part I : Pothu Tamil Paper I	6	0	4
S2EN11	Part II : General English Paper I	6	0	4
SMCH11	Part III Core 1 : Inorganic Chemistry I	4	0	4
SMCH12	Part III Core 2 : Physical Chemistry I	4	0	4
SMCHP1	Major Practical I :Volumetric Analysis I	0	2	2
SAMA11	Allied I Paper 1 : Algebra and Differential Equations	4	0	4
SEVS11	Part IV (Common): Environmental Studies	2	0	2
Total	(6T + 1P Courses)	26	2	24

SECOND SEMESTER

Subject Code	Subject Title	Lecture Hours	LAB Hours	Credits
S1TL21	Part I : Pothu Tamil Paper II	6	0	4
S2EN21	Part II : General English Paper II	6	0	4
SMCH21	Part III Core 3 : Inorganic Chemistry II	4	0	4
SMCH22	Part III Core 4 : Organic Chemistry I	4	0	4
SMCHP2	Major Practical II : Volumetric Analysis II	0	2	2
SAMA21	Allied I Paper 2 : Vector Calculus and Fourier Series	4	0	4
SVBE21	Part IV (Common) : Value Based Education	2	0	2
Total	(6T + 1P Courses)	26	2	24

THIRD SEMESTER

Subject Code	Subject Title	Lecture Hours	LAB Hours	Credits
S1TL31	Part I :Pothu Tamil Paper III	6	0	4
S2EN31	Part II : General English Paper III	6	0	4
SMCH31	Part III Core 5 : Organic Chemistry - II	4	0	4
SMCHP3	Major Practical III : Inorganic Qualitative Analysis	0	2	1
SAPH11	Allied Physics - II	2	0	3
SAPHP1	Allied Physics Practical II	0	2	1
SSCH3A	Part III: Skill Based Core I: Agro Chemistry	4	0	4
SNCS3B	Part IV : Non Major Elective I : Basic Programming Design	2	0	2
SYOG3A	Part IV (Common): Yoga	2	0	2
Total	(7T + 2P Courses)	26	4	25

FOURTH SEMESTER

Subject Code	Subject Title	Lecture Hours	LAB Hours	Credits
S1TL41	Part I : Pothu Tamil Paper IV	6	0	4
S2EN41	Part II : General English Paper IV	6	0	4
SMCH41	Paper III Core 6:Physical Chemistry II	4	0	4
SMCHP4	Major Practical IV : Inorganic Preparation and Physical Constant Determination	0	2	1
SAPH21	Allied Physics - II	2	0	3
SAPHP2	Allied Physics Practical II	0	2	1
SSCH4A	Part III : Skilled Based Core II: Chemistry in Medicine	4	0	4
SNC54A	Non Major Elective II : HTML	2	0	2
SCDE4A	Part IV (Common): Computers for Digital Era	2	0	2
SAEA41	Part V : Extension Activity : NCC/NSS/YRC/YWF	-	-	1
Total	(7T + 2P Courses)	26	4	26

FIFTH SEMESTER

Subject Code	Subject Title	Lecture Hours	LAB Hours	Credits
SMCH51	Part III Core 7: Organic Chemistry III	6	0	4
SMCH52	Part III Core 8 : Physical Chemistry III	6	0	4
SECH5A	Part III Major Elective I : Polymer Chemistry	4	0	4
SECH52	Part III Major Elective II : Analytical Chemistry	4	0	4
SMCHP5	Major Practical V : Organic Analysis	0	8	4
SMCHP6	Major Practical VI : Physical Chemistry experiments			
SCSB5A	Part IV (Common) : Personality Development	2	0	2
Total	(5T + 2P Courses)	22	8	22

SIXTH SEMESTER

Sub - Code	Subject Title	Lecture Hours	LAB Hours	Credits
SMCH61	Part III Core 9: Inorganic Chemistry III	5	0	4
SMCH62	Part III Core 10 : Organic Chemistry IV	5	0	4
SMCH63	Part III Core 11 : Physical Chemistry IV	5	0	4
SECH6B	Part III Major Elective III : Nano Chemistry	4	0	4
SMCHP7	Major Practical VII: Gravimetric Estimation & Organic Preparation	0	4	2
SMCH6P	Major Project	0	7	7
Total	(4T + 1P+ 1Project Courses)	19	11	25

Programme Outcomes

Intellectual Skills	
PO1	To demonstrate, solve and understand major concepts in all the disciplines of chemistry (viz., Organic Chemistry, Inorganic Chemistry, Physical Chemistry, Nano Chemistry, Polymer Chemistry, Analytical Chemistry, Medicinal Chemistry and Agro chemistry) covering the entire principles and perspectives.
PO2	To understand and apply the concept of chemistry to inter relate and interact to the other subject like mathematics, physics and computer science.
PO3	To develop critical thinking potential through solving problems methodically, independently and draw a logical conclusion by using basic chemistry knowledge and concepts.
PO4	To understand the role of chemistry in our society and become potent enough to explore new areas of research both in chemistry and in allied fields of research innovation and development.
PO5	To analyse and explain why chemistry is an integral activity for addressing social, economic, and environmental problems.
Practical Skills	
PO6	To impart the students, the knowledge about various chemical reagents and reactions. Thereby, improve their skills of handling the corrosive, poisonous, explosive and carcinogenic chemicals making themselves employable in any kind of chemical industries.
PO7	To create awareness to eco-friendly microscale experiments in practical and project courses.
PO8	To apply critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
Transferrable Skills	
PO9	To apply the skills and knowledge gained through the subject to real life situations.
PO10	To remember and to expand the knowledge available opportunities related to chemistry in the competitive examinations and the government services through public service commission particularly in the field of food safety, health inspector, pharmacist, forensic science with confidence.
PO11	To understand and foster ethical awareness/reasoning, social values/responsibility for maintaining and protecting the surrounding environment for improved living conditions.
PO12	To provide opportunity to act as team player and as a member of an interdisciplinary problem solving team by contributing in laboratory, field based situation and industry through evaluation skills.
PO13	To clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.

Programme Specific Outcomes

Course Outcomes

On completion of B.Sc. in Chemistry the students will be able to

PSO1	Understand the existence of matter in the universe as solids, liquids, and gases which are composed of molecules, atoms and sub atomic particles.
PSO2	Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life.
PSO3	Understand the concept of chemistry to inter relate and interact with the other subjects namely mathematics, physics, biological science etc.
PSO4	Become familiar with the specific aspects of branches of chemistry like Organic Chemistry, Inorganic Chemistry, Physical Chemistry, Nano Chemistry, Polymer Chemistry and Analytical Chemistry
PSO5	Grasp the mechanisms of different types of reactions both organic and inorganic and will be able to predict the products of unknown reactions.
PSO6	Get exposures of a breadth of experimental techniques using modern instrumentation.
PSO7	Achieve the skills required to succeed in graduate level, professional level and the chemical industry like agro product, Fertilizer industries etc.
PSO8	Analyse inorganic salt mixtures and organic compounds both qualitatively and quantitatively using the classical methods of analysis in practical classes.
PSO9	Synthesize the chemical compounds by manoeuvring the addition of reagents under optimum reaction conditions.
PSO10	Learn the laboratory skills and to transfer and interpret knowledge entirely in the working environment.

Course Outcomes

FIRST SEMESTER

The Students are able to:

<p>SMCH11</p>	<p>Core 1 : Inorganic Chemistry II</p>	<p>CO1 Explain the different atom models CO2 List the postulates of Bohr's theory. CO3 State the general characteristics of p block elements CO4 Describe the diagonal relationship between B and Si. CO5 Classify s, p, d and f block elements CO6 Distinguish between the types of chemical bonding and compare the hybridization and geometry of inorganic molecules CO7 Justify the Position of Hydrogen in the periodic table</p>
<p>SMCH12</p>	<p>Core 2 : Physical Chemistry I</p>	<p>CO1 Remember the concepts of ideal and real gases CO2 Explain the basics of Photochemistry CO3 Apply the colligative properties of dilute solutions in solving problems . CO4 Implement the working principles of Nuclear reactor and the applications of radio isotopes CO5 Examine the structure of crystals by X-ray diffraction methods</p>
<p>SMCHP1</p>	<p>Major Practical I Inorganic Quantitative (Volumetric) Analysis I</p>	<p>CO1 State the principles of using standard and link solutions and making up of given solution CO2 Implement the role of indicators at different pH range in the acidimetry and alkalimetry. CO3 Interpret the different types of Volumetric analysis. CO4 Apply acidimetric and alkalimetric method for the quantitative volumetric estimation of acids and bases CO5 Estimate the amount of inorganic compounds permanganometrically. CO6 Apply various volumetric procedures for the estimation of any inorganic compound.</p>
<p>SEVS11</p>	<p>Part IV: Environmental Studies</p>	<p>CO1 Define Ecosystem and list the various types of Ecosystem CO2 Classify the natural resources CO3 Compare and contrast between global, national and regional biodiversity CO4 Analyze the various factors causing environmental pollution CO5 Recognize the exploitation of natural resources and the growing energy needs CO6 Examine the importance of using renewable energy resources CO7 Judge the concept of globalization</p>

SECOND SEMESTER

The Students are able to:

SMCH21	Core 3: Inorganic Chemistry II	<p>CO1 Acquire knowledge on the isolation methods of inert gases from the atmosphere.</p> <p>CO2 State the uses of noble gases</p> <p>CO3 Explain the characteristics of d block elements.</p> <p>CO4 Differentiate d-block and f- block elements.</p> <p>CO5 Recognize the principle of metallurgy</p> <p>CO6 Compare various titrimetry</p> <p>CO7 Judge the role of EDTA in complexometry titrations</p>
SMCH22	Core 4: Organic Chemistry I	<p>CO1 Acquire knowledge on the basic concepts in organic chemistry</p> <p>CO2 Distinguish the properties of alkenes and alkynes</p> <p>CO3 Execute the rules of IUPAC nomenclature to name different organic compounds</p> <p>CO4 Understand the mechanisms of substitution and elimination reactions</p> <p>CO5 Rationalize between different structural isomers</p>
SMCHP2	Major Practical II Inorganic Quantitative Analysis II (Volumetric)	<p>CO1 Understand the principles of using standard and link solutions and making up of given solution.</p> <p>CO2 Apply iodimetry and dichrometry methods for the quantitative volumetric estimation.</p> <p>CO3 Estimate the amount of inorganic compounds complexometrically.</p> <p>CO4 Understand the role of EDTA in complexometry titrations.</p> <p>CO5 Apply various volumetric procedure for the estimation of any inorganic compounds</p>
SVBE21	Part IV: Value Based Education	<p>CO1 State the various parameters of social justice.</p> <p>CO2 List the factors responsible for social justice.</p> <p>CO3 Discuss the rights of marginalized people like women, children, dalits, minorities, physically challenged etc.</p> <p>CO4 Examine the Social issues caused due to alcoholism, drug addiction, poverty, unemployment etc.</p> <p>CO5 understand the concept of globalization.</p> <p>CO6 Appraise the values, ethics, duties and responsibilities of each individual in the society.</p>

THIRD SEMESTER

The Students are able to:

SMCH31	Core 5: Organic Chemistry II	<p>CO1 Acquire knowledge about aldehydes and ketones CO2 Explain the various methods of preparation of carboxylic acids CO3 List the synthetic uses of organo metallic compounds and organosulphur compounds CO4 State the uses of chloral, acrolein, crotonaldehyde and succinaldehyde CO5 Understand the mechanism of important reactions CO5 Differentiate between aldol and crossed aldol condensation reactions</p>
SMCHP3	Major Practical-III Inorganic Qualitative Analysis	<p>CO1 Examine the given inorganic salt systematically CO2 Analyze the acid radicals present in the given inorganic salt CO3 Eliminate the interfering acid radicals CO3 Analyze the basic radical systematically CO4 Test the basic radicals present in the given salt CO5 Develop their skill of analysing the given inorganic salt correctly</p>
SSCH3A	Skill Based Core I Agro Chemistry	<p>CO1 Distinguish between micro and macro nutrients for plant growth CO2 Classify pesticides into insecticides, fungicides and herbicides CO3 Discuss the beneficial role of soil organisms CO4 Acquire knowledge about the physical aspects of soil CO5 Identify acid, alkaline and saline soils CO6 Estimate the total organic compound, available nitrogen and phosphorus in the soil sample</p>
SACH11	Allied I Allied Chemistry I	<p>CO1 Explain the atomic structure and bonding CO2 Understand the various reactions of organic compounds CO3 Identify the photochemical reactions CO4 Appreciate the importance of polymers and polymer science. CO5 Gain knowledge about the lubricants and cosmetics used in the modern world.</p>
SACHP1	Allied Chemistry Practical I Inorganic Quantitative Analysis	<p>CO1 Recognize the importance of Quantitative analysis CO2 Distinguish between the different types of Volumetric analysis CO3 Develop the skill of making up of solutions of primary and secondary standards CO4 Specify the role of indicators at different pH range in acidimetry and alkalimetry. CO5 Report the strength of the solution and the amount of the substance present in the given solution.</p>

FOURTH SEMESTER

The Students are able to:

SMCH41	Core 6: Physical chemistry II	<p>CO1 Understand the basic concepts of I law of thermodynamics</p> <p>CO2 Formulate the II law of thermodynamics</p> <p>CO3 Recognize the concept of chemical equilibrium</p> <p>CO4 Differentiate between the various methods of expressing the concentration of solutions</p> <p>CO5 Acquire knowledge on electrochemistry and its application</p>
SSCH4A	Skill Based Core II: Chemistry in Medicine	<p>CO1 Acquire knowledge on first aid and the important rules to be followed</p> <p>CO2 Classify the common poisons</p> <p>CO3 Differentiate between acid poisoning and basic poisoning</p> <p>CO4 Recognize the causes and treatment of some common diseases</p> <p>CO5 List the biological importance of sodium, potassium, calcium, iodine and copper</p> <p>CO6 Classify vitamins</p> <p>CO7 Apply the knowledge of Benedict's test to find the level of sugar in urine</p> <p>CO7 Gain awareness on the deficiency diseases of various vitamins</p>
SMCHP4	Major Practical IV Inorganic Preparations & Determination of Physical Constants	<p>CO1 State the procedure for the preparation of inorganic compounds</p> <p>CO2 Understand the mechanisms involved in the preparation of inorganic compounds</p> <p>CO3 Synthesize some important Inorganic compounds</p> <p>CO4 Acquire knowledge about the importance of physical constants</p> <p>CO5 Check the purity of compounds by determining the melting point and boiling point.</p>
SACH21	Allied II Allied Chemistry II	<p>CO1 Discuss the chemistry of basic aromatic compounds.</p> <p>CO2 Distinguish between nuclear fission and fusion</p> <p>CO3 Classify carbohydrates, amino acids and proteins</p> <p>CO4 Acquire knowledge on fuels, fertilizers, cement and glass.</p> <p>CO5 Appreciate the cleansing action of soaps and detergents</p>
SACHP2	Allied Practical II Inorganic Qualitative Analysis	<p>CO1 Acquire knowledge on the systematic Qualitative Analysis of inorganic salts.</p> <p>CO2 Analyze the acid and basic radicals present in the given salt systematically.</p> <p>CO3 Recognize the importance of elimination of the interfering basic radicals.</p> <p>CO4 Identify the acid and basic radicals present in the given salt.</p> <p>CO5 Develop the skill of qualitative analysis of any given inorganic salt.</p>

FIFTH SEMESTER

The Students are able to:

SMCH51	Core 7: Organic Chemistry III	<p>CO1 Acquire detailed knowledge on stereochemistry. CO2 Understand Huckel's rule. CO3 Apply Cahn-Ingold-Prelog rules to determine R and S notations for optical isomers. CO4 Discuss about the conformations of cycloalkanes. CO5 Explain the concept of aromaticity CO6 Appreciate the mechanisms of nitration, halogenation, sulphonation and Friedel-Crafts reaction.</p>
SMCH52	Core 8: Physical Chemistry III	<p>CO1 State and explain third law of thermodynamics. CO2 Distinguish between reversible and irreversible cell. CO3 List the general characteristics of catalytic reactions in surface chemistry. CO4 Understand the concept of symmetry element, symmetry operations and group multiplication table. CO5 Identify the types of molecular spectra with different energy levels.</p>
SECH5A	Major Elective I Polymer Chemistry	<p>CO1 State the concept of polymerization. CO2 Distinguish the different types of polymer. CO3 List the characteristics of polymers. CO4 Acquire knowledge about the polymerization techniques and polymer processing. CO5 Describe the chemistry of individual polymers. CO6 Explain the recent advances in biopolymers and their applications in medicine.</p>
SECH52	Major Elective II Analytical Chemistry	<p>CO1 Acquire knowledge on the data analysis methods & apply the concept of error analysis, accuracy and precision in various fields. CO2 Analyze pH, conductivity, acidity, alkalinity and hardness of water. CO3 Understand the importance of fuels in industries. CO4 Explain the method of determination of calorific value of Coal. CO5 Specify the applications of electro-analytical methods to qualitative and quantitative analysis. CO6 Appreciate the principle, instrumentation and applications of colorimetry, spectrophotometry and fluorimetry.</p>
SCSB5A	Skill Based Core III Personality Development	<p>CO1 Acquire a clear idea about personality, self-awareness and goal setting. CO2 List the advantages and disadvantages of self-monitoring. CO3 Develop team building, leadership and negotiation skills. CO4 Appreciate the importance of communication and acquire effective communication skills. CO5 Solve the barriers in communication.</p>


SMCHP5	Major Practical V Organic Qualitative Analysis	<p>CO1 Understand the analytical procedure used to identify the given organic compound.</p> <p>CO2 Analyse systematically and identify saturation/unsaturation and aliphatic/aromatic nature of the given organic compound.</p> <p>CO3 Test and find the elements (other than C, H and O) present in the given compound.</p> <p>CO4 Identify the functional group present in the given organic compound.</p> <p>CO5 Develop the skills of preparation of derivatives for all the functional groups.</p>
SMCHP6	Major Practical VI Physical Chemistry Experiments	<p>CO1 Determine the molecular weight of any given substance.</p> <p>CO2 Apply the principle of conductometry and potentiometry in estimation of unknown compound.</p> <p>CO3 Determine the concentration of unknown compound.</p> <p>CO4 Apply the concept of phase equilibria to simple eutectic systems.</p>

SIXTH SEMESTER

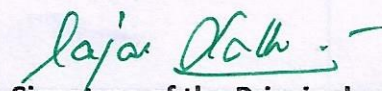
The Students are able to:

SMCH61	Core 9 : Inorganic Chemistry III	<p>CO1 Compare the structural and stereoisomerism in tetrahedral, square planar and octahedral complexes.</p> <p>CO2 Understand the Splitting of orbitals in octahedral and tetrahedral geometry.</p> <p>CO3 Develop the skill of calculating the crystal field stabilization energy.</p> <p>CO4 Explain the mechanism of substitution reactions in octahedral and square planar complexes.</p> <p>CO5 Appreciate the process of photochemical conversion and storage of solar energy.</p>
SMCH62	Core 10 : Organic Chemistry IV	<p>CO1 Acquire knowledge on carbohydrates, their importance and structure.</p> <p>CO2 Explain the chemistry of aromatic compounds like phenols, aldehydes, ketones and acids.</p> <p>CO3 Discuss the mechanisms of rearrangement reactions.</p> <p>CO4 Appreciate the structure elucidation of natural products, alkaloids and terpenoids.</p> <p>CO5 Recognize various spectroscopic techniques and their applications in organic chemistry.</p>
SMCH63	Core 11 : Physical Chemistry - IV	<p>CO1 Explain the principle and applications of Raman, NMR, ESR and mass spectroscopy.</p> <p>CO2 Compare the characteristics of first, second, third and zero order reactions and determine their rate constants.</p> <p>CO3 State Ostwald's dilution law, common ion effect and solubility product.</p> <p>CO4 Apply phase rule and draw phase diagrams for one and two component systems.</p> <p>CO5 Describe the various methods of synthesis of nanomaterials.</p>
SECH6B	Major Elective –III Nano Chemistry	<p>CO1 Obtain knowledge on the basic concepts of nanochemistry.</p> <p>CO2 Understand the synthesis of nanomaterials by various methods</p>

		<p>CO3 Describe the importance of nanocatalysts and carbon based nanomaterials.</p> <p>CO4 Discuss the structure and properties of graphite, diamond and fullerenes.</p> <p>CO5 Appreciate the characterization and applications of nanomaterials.</p>
SMCHP7	Major Practical – VII Gravimetric Estimation & Organic Preparations	<p>CO1 Understand the principle of gravimetric analysis.</p> <p>CO2 List the conditions for precipitation reactions.</p> <p>CO3 Explain the mechanisms involved in the preparation of organic compounds.</p> <p>CO4 Estimate the given substance gravimetrically.</p> <p>CO5 Develop the skill of synthesizing organic compounds followed by drying and recrystallization.</p>
SMCH6P	Project	<p>CO1 Develop the skill of pursuing research in the area of their interest which will improve their research aptitude and increase the contribution of young generation for the development of Chemistry.</p>

 18/06/2018

Signature of the HoD
 Head of the Department
CHEMISTRY
 ANNAI HAJIRA WOMEN'S COLLEGE,
 MELAPALAYAM - 627 005.



Signature of the Principal
PRINCIPAL 18/06/2018
 ANNAI HAJIRA WOMEN'S COLLEGE
 MELAPALAYAM - 627 005.