



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			1			
Course Code	Course Name	Periods per Week			Credit	Maximum Marks			
		L	T	P	C	CA	ESE	Total	
18U1CHC01	General Chemistry - I		6	0	0	6	25	75	100
COURSE OBJECTIVES	<p>To learn about the fundamentals of chemistry and principles of various topics. To learn about the outline of basic concepts of organic chemistry. To critique errors and titrimetry.</p>								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,								
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.								
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,								
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,								
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.								
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.								
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.								
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.								
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,								
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students understand the periodic properties and electronic configurations of s p d and f block elements
CO 2	Students gain an insight into basic chemical concepts in organic chemistry
CO 3	Students apply the different chemical concepts to different gaseous system and real time problems
CO 4	Students analyze the various atom models
CO 5	Students evaluate the magnitude of various Possible errors in volumetric analysis
Pre-requisites	NIL

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
		PO 7	2
CO 5	5	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	1
PSO2	1	1	2	3	2
PSO3	2	2	1	1	1

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations	
Indirect	
1. Course End Delivery	

Content of the Syllabus			
Unit - I	Electronic structure and periodic properties	Periods	12
	Quantum numbers and their significance, Pauli s exclusion principle, Hunds rule, Aufbau principle, Extra stability of half filled and completely filled orbital, Electronic configuration of atoms. Modern periodic law, Long form of periodic table, cause of periodicity, division of elements into s, p, d, and f blocks. Variation of atomic radius, ionic radius, ionization energy, electron affinity and electro negativity along the periods and the groups Factors affecting ionization energy and electro negativity		
Unit - II	Basic concepts in organic chemistry	Periods	12
	Covalent bonding Concept of hybridization Structure of organic molecules based on sp^3 , sp^2 and sp hybridization Covalent bond properties of organic molecules bond length, bond angle, bond energy, bond polarity, dipole moment. Electron Displacement effects Inductive, Mesomeric, Electromeric and Hyperconjugative effects. Reactive intermediates carbocations - carbanions - free radicals with examples		
Unit - III	Gaseous State	Periods	12
	PO stulates of kinetic theory of gases, derivation of kinetic gas equation, ideal gas equation, Boyles law, Charles law, Grahams law of gaseous diffusion and Daltons law of partial pressure. Maxwells distribution of molecular velocities, Root mean square, average and most probable velocity, Collision diameter, collision frequency, collision number and mean free path Deviations of real gases from ideal behavior Derivation of Vander Waals equation for real gases. Critical phenomena PV isotherms of real gases, continuity of states, critical constants, relationship between critical and Vander Waals constants, determination of critical volume, the principle of corresponding states, liquefaction of gases..		
Unit - IV	Basic Quantum Chemistry	Periods	12
	CGS and SI units Basic units derived units subsidiary units Quantum theory and atomic spectra Bohrs model of atom Limitations of Bohr model Somerfields model photoelectric effect Compton effect de Broglie equation Davisson and Germer experiment Heisenbergs uncertainty principle Schrodingers wave equation (statement only) Eigen values Eigen function Significance of Radial and angular distribution function Concept and Shapes of orbital Differences between orbit and orbital.		
Unit - V	Error Analysis	Periods	12
	Errors and its types Significant figure, Definitions of molarity, molality, normality and mole fraction. Titration - Back titration Equivalence point indicator Standard solution Primary and secondary standards Types of titrations Acid base and redox. Analysis of basic radicals Group separation and confirmatory tests for basic radicals		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co (2017)
2	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition), Vishal publishing co., (2017)
3	Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S Chand & Co (2016)
References	
1	Morrison R.T. and Boyd R.N., Organic Chemistry (7th Edition), Pearson Education, India (2010)
2	Madan. R. D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co (2012)
3	Mukherji. S. M, Singh. S. P, Kapoor. R.P, Organic Chemistry volume I (4th edition) New age International (p) limited (1998)
E-References	
1	https://chem.libretexts.org/Core/InorganicChemistry/DescriptiveChemistry/Periodic Trends of Elemental_Properties/Periodic_Properties_of_the_Elements
2	unicorn.ps.uci.edu/M3LC/lectures/LectureWeek1.pdf

Signature of BOS Chairman



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Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			2				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U2CHC02	GENERAL CHEMISTRY-II		5	0	0	5	25	75	100	
COURSE OBJECTIVES	1.To gain knowledge about shapes of inorganic molecules and metallurgy. 2.Acquire the knowledge about hydrocarbons. 3.To study about liquids and liquid crystals.									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
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PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students evaluate the shapes of simple covalent molecules.
CO 2	Students design the methods of extraction, separation and purification of metals from its corresponding ore.
CO 3	Students identify the methods of preparation and properties of alkanes and alkenes.
CO 4	Students assess the classification and reaction of dienes and alkynes.
CO 5	Students identify the various properties of liquids and liquid crystals.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	5	PO 1	2
		PO 2	1
CO 2	2	PO 3	5
		PO 4	5
CO 3	4	PO 5	4
		PO 6	6
CO 4	3	PO 7	2
		PO 8	4
CO 5	2	PO 9	1
		PO 10	3
PSOs	KLs	PO 11	3
PSO 1	3	PO 12	2
		PO 13	1
PSO 2	4	PO 14	6
		PO 15	3
PSO 3	1		

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO4	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO5	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	1	2	2	3	2
PSO2	2	1	3	2	1
PSO3	1	2	1	1	2

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Chemical bonding	Periods	12
	Ionic bond- factors influencing the formation of ionic bond- characteristics of ionic compounds- lattice energy and its determination using Born-Haber Cycle. Covalent bond- factors influencing the formation of bond- characteristics of covalent compounds -partial ionic character in covalent compounds- polarization of ions- Fajan s rule and its applications. VSEPR theory- explanation of shapes of simple covalent molecules such as NH ₃ , H ₂ O, CH ₄ . Molecular orbital theory- molecular orbital configuration of homo nuclear diatomic molecules- H ₂ , He ₂ , F ₂ , O ₂ and hetero nuclear molecular orbital - CO and NO.		
Unit - II	Metallurgy	Periods	12
	Occurrence of metals - various steps involved in the metallurgical processes. Concentration of ore by froth floatation-gravity separation-magnetic separation processes. Calcination- Roasting - smelting-Alumino thermic process. Purification of metals by electrolysis - zone refining. Extraction of Al, Cu, Fe and U.		
Unit - III	Alkanes and Alkenes	Periods	12
	Petroleum source of alkanes - Methods of preparing alkanes - Chemical properties. Mechanism of free radical substitution in alkanes by halogenation - Uses - Conformational study of ethane and n-butane. Cycloalkanes - nomenclature - methods of formation - chemical reactions, Baeyer s strain theory and its limitations. Alkenes- orbital model of double bond, chemical reactions of alkenes- mechanism of Electrophilic and free radical additions- Markovnikoff s rule, peroxide effect, hydroboration, ozonolysis and allylic substitution by NBS. Diels-alder reaction. Elimination reactions-mechanisms of E1 and E2 reactions- Hofmann and saytzeff rule.		
Unit - IV	Alkadiene and Alkynes	Periods	12
	Dienes- classification of dienes- isolated, conjugated, cumulated dienes, structure of allene and butadiene, 1, 2 and 1,4 addition. Orbital model of triple bond- chemical reactions of alkynes- acidity of alkynes- formation of acetylides- mechanism of Electrophilic and nucleophilic addition reactions of alkynes - hydrogenation, halogenation, hydrohalogenation, hydration, hydroboration - oxidation, Oxymercuration Demercuration, metal ammonia reduction, oxidation and polymerization.		
Unit - V	Liquid State	Periods	12
	Structure of liquids-Vapour pressure-Trouton s rule- Determination of Vapour pressure -dynamic and static method -Effect of temperature on vapour pressure -Surface tension-Surface energy surface active reagents- Some effects of surface tension-viscosity-Effect of temperature on viscosity Experimental determination of surface tension and viscosity not necessary. Refractive index - Specific refraction - Molar refraction Optical activity. Liquid crystals The mesomorphic state - classification of liquid crystal smectic-nematic and cholestric liquid crystals.		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition, Vishal publishing co.,2017.
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3	Mukherji. S. M, Singh. S. P, Kapoor. R.P, Organic Chemistry volume I 4th edition New age International pvt limited 1998.
E-References	
1	https://www.khanacademy.org/science/biology/chemistry--of-life/chemical-bonds-and-reactions/v/ionic-covalent-and-metallic-bonds
2	https://www.cliffsnotes.com/study-guides/chemistry/organic-chemistry-i/structure-and-properties-of-alkanes/alkanes-physical-properties
3	https://chem.libretexts.org/
4	http://www.chem.tamu.edu/class/fyp/mcquest/mcquest.html
5	http://nptel.ac.in/courses/104103069/15



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Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			2			
Course Code	Course Name	Periods per Week			Credit	Maximum Marks			
		L	T	P	C	CA	ESE	Total	
18U2CHCP01	Core Practical - I				3	05	25	75	100
COURSE OBJECTIVES	To understand the principles of volumetric analysis. To know about different types of volumetric titrations. To enable the students to have hands-on training on preparation of simple								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
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PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
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PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students will learn how to make solutions and do the titrations with different kinds
CO 2	Students will understand reactions taking place during the experiment
CO 3	The students will be able to apply the knowledge about nature, significance, and influence of errors and to be avoided or minimized during quantitative examination of experiment
CO 4	Students will analyze the given samples volumetrically
CO 5	To evaluate the known techniques to prepare, recrystallize and finding melting point of simple inorganic compound
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	1
CO 2	2	PO 3	5
		PO 4	5
CO 3	3	PO 5	4
		PO 6	6
CO 4	4	PO 7	2
		PO 8	4
CO 5	5	PO 9	1
		PO 10	3
PSOs	KLs	PO 11	3
PSO 1	3	PO 12	2
		PO 13	1
PSO 2	4	PO 14	6
		PO 15	3
PSO 3	2		

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2	
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2	
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3	
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2	
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1	

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	1
PSO2	1	1	2	3	2
PSO3	3	3	2	1	1

Course Assessment Methods**Direct**

1. Continuous Assessment Test I, II & Model
2. Assignment
3. End Semester Examinations

Indirect

1. Course End Delivery



Content of the Syllabus

Unit - I	Acidimetry	Periods	9
	<ol style="list-style-type: none"> 1. Estimation of sodium hydroxide-standard sodium carbonate. 2. Estimation of hydrochloric acid- standard oxalic acid. 3. Estimation of Oxalic acid -standard-oxalic acid 		
Unit - II	Permanganometry	Periods	9
	<ol style="list-style-type: none"> 1. Estimation of oxalic acid-std-Mohr s salt or ferrous sulphate. 2. Estimation of sodium nitrite-standard oxalic acid. 3. Estimation of ferrous ion. 		
Unit - III	Iodometry	Periods	6
	<ol style="list-style-type: none"> 1. Estimation of copper-standard Potassium dichromate. 2. Estimation of Potassium dichromate-standard potassium dichromate 		
Unit - IV	Dichrometry	Periods	3
	<ol style="list-style-type: none"> 1. Estimation of ferric ion using diphenyl amine/N-Phenylanthranilic acid as indicator 		
Unit - V	INORGANIC PREPARATIONS	Periods	15
	<ol style="list-style-type: none"> 1. Micro-Cosmic salt. 2. Potassium trioxalatochromate(III) 3. Ferrous Ammonium sulphate. 4. Tetramminecopper sulphate(II) 5. Tris thiourea copper chloride(I) 		
Total Periods			42

Text Books

1	V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).
References	
1	Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012)
E-References	
1	https //byjus.com/chemistry/volumetric-analysis/
2	https //chem.libretexts.org

Signature of BOS Chairman

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Programme	B.Sc	Programme Code	UCH	Regulations	2018-2019				
Department	Chemistry		Semester		3				
Course Code	Course Name	Periods per Week			Credit	Maximum Marks			
		L	T	P	C	CA	ESE	Total	
18U3CHC03	GENERAL CHEMISTRY-III		6	0	0	5	25	75	100
COURSE OBJECTIVES	1.To acquire knowledge about the fundamentals and principles of chemistry.2.To educate the students about the functional groups of organic compounds.3.To understand the concept of thermodynamic terms.								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								

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PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,

COs	COURSE OUTCOME
CO 1	Students gain the knowledge of preparation, properties and uses of some important d-block metal compounds
CO 2	Students know different types of hydrides, preparation, properties and its uses.
CO 3	Students study about preparation, properties and uses of alcohols, phenols and aromatic hydrocarbons
CO 4	Students learn about preparation, properties of aldehydes, ketones and some naming reactions
CO 5	Students able to study about the thermodynamic terms and laws.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
		PO 2	1
CO 2	1	PO 3	5
		PO 4	5
CO 3	3	PO 5	4
CO 4	6	PO 6	6
		PO 7	2
CO 5	5	PO 8	4
PSOs	KLs	PO 9	1
		PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	2	3	1	1	1	1	2	1	3	1	1	2	3	1	1
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	1	3	1	1	1	1	1	1	1	3	1
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	1	3	1	1
PSO2	1	1	2	1	2
PSO3	2	3	1	1	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Transition elements	Periods	12
	The d - block elements - Position in the periodic table - Electronic configuration- General characteristics of d - block elements. Occurrence - extraction, properties and uses of Mo and Pt. Important compounds of transition metals: preparation, properties and uses of Ziegler - Natta catalyst, Prussian blue, Sodium nitro prusside, Turnbull's blue, Nickel DMG complex, Wilkinson's Catalyst, KMnO ₄ , ammonium molybdate and K ₂ Cr ₂ O ₇ .		
Unit - II	Hydrides	Periods	12
	Hydrides - Classification of hydrides - Ionic Hydrides: LiH, NaH - preparation, properties, uses. Covalent Hydrides: Silanes - Chemistry of Mono and Disilanes - Boron hydrides - preparation, properties and structure of Diborane. Complex Hydrides: NaBH ₄ , LiAlH ₄ - structure, preparation, properties and uses.		
Unit - III	Alcohols, Phenols and aromatic hydrocarbons	Periods	12
	Aliphatic alcohols: Introduction - Nomenclature - preparation, properties and distinction between 1°, 2° and 3° alcohols - Aromatic alcohols: Introduction - preparation and properties of benzyl alcohol. Phenol and its types: Introduction - acidity - preparation, properties and uses of phenol. Dihydric phenols: Introduction - preparation of catechol, resorcinol and quinol. Trihydric phenols: Introduction - preparation of pyrogallol, hydroxyquinol, phloroglucinol. Aromatic hydrocarbons: Aromaticity – Huckel's rule - Electrophilic substitution reactions in aromatic compounds (general mechanism only).		
Unit - IV	Carbonyl compounds	Periods	12
	Introduction - structure of carbonyl compounds - Nomenclature - Preparation and properties of aldehydes and ketones. Chemical properties: Addition reactions, Reactions involving alkyl groups, reduction and oxidation reactions and some important name reactions - Haloform, Reformatsky reaction, Aldol condensation, pinacol-pinacolone rearrangement, Wittig Reaction - Chemistry of acetone and acetaldehyde.		
Unit - V	Thermodynamics - I	Periods	12
	Thermodynamic terms - system, surrounding and boundary - homogenous and heterogeneous system - types of thermodynamic system - state of system - equilibrium and non equilibrium state - nature of work and heat - law of conservation of energy - First law of thermodynamics - Enthalpy of a system - Heat capacity of a system - work done in reversible isothermal compression - work done in reversible adiabatic expansion - Joule Thomson effect, Joule Thomson coefficient, inversion temperature - zeroth law of thermodynamics - absolute temperature scale .		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (47th edition) Vishal publishing co., (2017).
3	Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).
References	
1	Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1992).
2	Madan.R.D., Inorganic Chemistry (3rd edition), New Delhi, S. Chand and Co., (2012).
3	Mukherji.S.M, Singh.S.P, Kapoor.R.P, Organic Chemistry volume " I (4th edition) New Age International (p) limited (1998).
E-References	
1	https://www.askiitians.com/iit-jee-chemistry/inorganic-chemistry/hydrogen/hydrides.html
2	nsdl.niscair.res.in/jspui/bitstream/123456789/778/1/Revised%20thermodynamics.pdf
3	https://www.askiitians.com/iit-jee-chemistry/organic-chemistry/carbonyl-compounds/aldehydes-and-ketones/chemical-properties-of-aldehydes-and-ketones.html

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			4			
Course Code	Course Name		Periods per Week		Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total
18U4CHC04	General Chemistry - IV		6	0	0	5	25	75	100
COURSE OBJECTIVES	1.To study about the fundamentals and applications of nuclear chemistry. 2.To acquire the knowledge about carboxylic acids, its derivatives, Aliphatic and Aromatic amines. 3.To understand the principle and significance of thermodynamics.								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
PO 3	Capability to apply analytic thought to a body of knowledge;analyse and evaluate evidence,arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,								
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.								
PO 5	Ability to evaluate the reliability and relevance of evidence;identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,								
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,								
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.								
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.								
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.								
PO 10	Capability to use ICT in a variety of learning situations,demonstrate ability to access, valuate, and use a variety of relevant information sources; and use appropriate software for analysis of data.								
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,								
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students identify the fundamentals and applications of nuclear chemistry.
CO 2	Students demonstrate the preparations and properties of mono and dicarboxylic acids.
CO 3	Students understand about the Nomenclature, preparations and properties of some aliphatic and aromatic amines.
CO 4	Students learn about the concepts and significance of various thermodynamic functions
CO 5	Students analyze about the bond energy, free energy, exothermic and endothermic reactions.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	2
		PO 2	1
CO 2	6	PO 3	5
		PO 4	5
CO 3	2	PO 5	4
CO 4	1	PO 6	6
		PO 7	2
CO 5	4	PO 8	4
PSOs	KLs	PO 9	1
		PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO2	1	1	2	2	1	3	1	1	1	1	1	1	1	3	1
CO3	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO4	2	3	1	1	1	1	2	1	3	1	1	2	3	1	1
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	1	2	1	2
PSO2	3	1	1	1	3
PSO3	1	1	2	3	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Nuclear Chemistry	Periods	12
	Constitution of the nuclei - stable and unstable nuclei and their relationship to (n/p) ratio. Nuclear forces - Natural radioactivity - modes of decay - Radioactive decay series - Nuttall rule and average life - Radioactive equilibrium - Mass defect and binding energy - Numerical problems - Artificial transmutation and artificial radioactivity. Nuclear fission - atom Bomb and nuclear reactors - Nuclear fusion - fusion reaction in the sun, Hydrogen bomb. Application of radioactive isotopes - C14 dating, rock dating - Isotopes as tracers - Medicinal Applications.		
Unit - II	Carboxylic acids and derivatives	Periods	12
	General preparation and reactions of Monocarboxylic acids - Preparation, properties and uses of Dicarboxylic acids: Succinic, Maleic and Fumaric acid. Hydroxy acids: Lactic acid, Malic acid, Tartaric and Citric acid. Aromatic dicarboxylic acid: Phthalic acid. Acid derivatives: preparations of Acid chlorides, Anhydrides, Esters and amides. Reactions involving acid derivatives - Hofmann, Curtius, Lossen and Schmidt rearrangements.		
Unit - III	Organic Nitrogen Compounds	Periods	12
	Aliphatic Amines: Nomenclature - Separation of amines by Hinsberg's and Hoffmann methods - General methods of preparation and properties of primary amines. Distinction between 1 ^o , 2 ^o and 3 ^o amines. Aromatic Amines: Basicity of Aromatic amines - Derivatives of aniline - Acetanilide - preparation and properties. Diazonium compounds - Diazotization mechanism, preparation and properties of diazoacetate.		
Unit - IV	Thermodynamics - II	Periods	12
	Limitations of first law - Need for second law - Spontaneous process - cyclic process - Carnot cycle - efficiency - Carnot theorem - thermodynamic scale of temperature. Concept of Entropy - Units of Entropy - entropy a state function - entropy change in isothermal expansion of an ideal gas - Calculation of entropy changes of an ideal gas with changes in P, V & T. Entropy of mixture of ideal gases - physical significance of entropy. Work & free energy functions - partial molar free energy - Gibbs Duhem equation - Gibbs-Helmholtz equation - Clapeyron - Clausius equation. Third law of thermodynamics		
Unit - V	Thermochemistry	Periods	12
	Introduction - Enthalpy change in a chemical reaction - Exothermic and endothermic reactions - Relation between heats of reaction at constant volume and pressure - Standard Enthalpy - Determination of enthalpies - Kirchoff's equation - Hess's Law and its applications - measurement of enthalpy - Bond energy and its applications - Nernst Heat theorem - Flame temperature and Explosion temperature.		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , (47th edition) Vishal publishing co., (2017).
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1	Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1992).
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3	Mukherji.S.M, Singh.S.P, Kapoor.R.P, Organic Chemistry volume “ I (4th edition) New Age International (p) limited (1998).
E-References	
1	http://www.ltconline.net/stevenson/2008CHM101Fall/CHM101Lecture Notes20081201a. htm
2	https://www.askiitians.com/iit-jee-amines-and-nitrogen-containing-compounds/amines-and-its-preparation-methods/
3	nptel.ac.in/courses/101104063/25

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			4				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U4CHCP02	Core Practical II		6	0	0	4	25	75	100	
COURSE OBJECTIVES	1.To understand the principles of qualitative analysis. 2.To expose the students to separate anions and cations. 3.To enable the students to understand the techniques to remove interfering from non interfering radicals.									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge;analyse and evaluate evidence,arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence;identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
PO 10	Capability to use ICT in a variety of learning situations,demonstrate ability to access, valuate, and use a variety of relevant information sources; and use appropriate software for analysis of data.									
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students learn how to separate the cations and anions systematically.
CO 2	Students gain the knowledge about group separation of various cations.
CO 3	Students enable to acquire knowledge about interfering and non interfering ions.
CO 4	Students learn how to analyze the cations and anions using preliminary tests.
CO 5	Students find some cations using flame test.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	4	PO 2	1
		PO 3	5
CO 3	1	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
		PO 7	2
CO 5	5	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO3	2	3	1	1	1	1	2	1	3	1	1	2	3	1	1
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	2	1
PSO2	1	3	1	3	2
PSO3	2	1	3	1	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Content of the Syllabus			
Unit - I	Semimicro Qualitative Analysis of Inorganic Mixtures	Periods	45
	ANIONS TO BE ANALYSED: Carbonate, Sulphate, Nitrate, Chloride, Fluoride, Borate, Oxalate, Phosphate radicals. CATIONS TO BE ANALYSED: Lead, Bismuth, Copper, Cadmium, Aluminium, Cobalt, Nickel, Zinc, Barium, Strontium, Calcium, Magnesium, Ammonium radicals.		
	Total Periods		45

Text Books

1	1.V. Venkateswaran, R. Veeraswamy and A.R.Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S.Chand & Co, (1995).
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References

1	1. Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012)
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E-References

1	1. http://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=1
2	2. http://www.federica.unina.it/agraria/analytical-chemistry/inorganic-qualitative- analysis/

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			1				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U1CHA01	Allied Chemistry - I		5	0	0	5	25	75	100	
COURSE OBJECTIVES	To impart knowledge in formation of molecule from atoms and various organic reaction mechanism, To prepare students for a carrier in chemical industries and To acquire basic knowledge in fundamental aspects of practical chemistry.									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.									
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students learn about bonding, anti bonding, non bonding and Interhalogen compounds.
CO 2	Students acquire knowledge about the fundamental concepts of acid and base and to determine the hardness of water.
CO 3	Students able to apply the knowledge to prepare various concentration of solution.
CO 4	Students understand about the various antibiotics and drugs.
CO 5	Students evaluate the characteristics of soil, fertilizers and pesticides.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	5	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
		PO 7	2
CO 5	2	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	
CO1	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1	
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2	
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3	
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2	
CO5	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2	

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	1	2	3	2	2
PSO2	2	1	2	3	1
PSO3	1	2	1	1	2

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Chemical bonding and Aromaticity	Periods	12
	Chemical Bonding Definition types Ionic bond and covalent bond, hydrogen bond -formation and characteristics properties -bond order- magnetic properties. Structure of NaCl, CaF ₂ . MO theory-bonding in H ₂ , O ₂ , N ₂ using MO theory -bonding -bond order- magnetic properties. Aromaticity -Huckels rule-types - Examples.		
Unit - II	Acid and Base theory	Periods	12
	Arrhenius concept - Lowry-bronsted theory -Lewis acid and base theory - Conjugated Acid and base-Strength of an Acid and base. Principle and Classification of Hard acid and Base -Soft Acid and base-HSAB. Acidity of water - Alkalinity-PH -hardness of water- types of hardness - methods RO and Zeolite process.		
Unit - III	Volumetric analysis	Periods	12
	Law of Volumetric analysis-Definitions of molarity, molality, normality and mole fraction. Titration-Back titration-Equivalence point-Indicator - Standard solution - Primary and secondary standards- Types of titrations- Acid-base and redox.		
Unit - IV	Pharmaceutical Chemistry-I	Periods	12
	Definition of the terms - Drug, Pharmacy, Pharmacophore, Pharmacodynamics and Pharmacopoeia. Antibiotics - Definition, classification - broad and narrow spectrum antibiotics. penicillin, chloramphenicol and erythromycin - structure and uses -structure elucidation not needed. Sulpha drugs-preparation of sulphaguanine and sulphathiazole. Mechanism and mode of action of sulpha drugs.		
Unit - V	Agricultural Chemistry	Periods	12
	Soil types-red soil, black soil, alluvial soil, desert soil, red soil; role of humus: Manures and their importance. Chemical fertilizers- Natural and synthetic fertilizers: Classification of NPK fertilizer-Preparation of Urea, Ammonium sulphate, Triple super phosphate potassium nitrate; role of macronutrients and micronutrients. Pesticides- classification-insecticides, herbicides and fungicides- Structure of important pesticides: DDT, BHC.		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry (33rd edition), Vishal publishing co., (2017).
2	Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., (2008).
3	Sharma B.K., Industrial chemistry including chemical engineering (16th), Meerut, Krishnaprakasham media., (2011).
4	Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (22nd edition), New Delhi, S. Chand & Co., (2016).
5	Dr.R.D.Madan, Modern inorganic chemistry,(3rd edition), New Delhi,S. Chand & Co., (2014).
References	
1	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , 47th edition, Vishal publishing co., 2017.
2	Jayashree Ghosh, Text Book of Pharmaceutical Chemistry, S. Chand, New Delhi,1999.
3	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry , 50th edition, New Delhi, S. Chand &Co., 2011.
E-References	
1	www.sparknotes.com/chemistry/bonding/molecularorbital/section1.rhtm
2	www.organic-chemistry.org/namedreactions/nucleophilic-substitution-sn1-sn2.shtm
3	www.soest.hawaii.edu/oceanography/courses/OCN633/Fall%202013/Titrimetry.pdf
4	chem.libretexts.org/

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			2				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U2CHA02	Allied Chemistry - II		5	0	0	5	25	75	100	
COURSE OBJECTIVES	To compile students with various chromatography techniques and its applications towards industries and research laboratories. To educate about the chemistry of bio-organic and bio-inorganic compounds and various kinds of drugs and its uses.									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.									
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students predict the concept of various chromatographic techniques.
CO 2	Students identify the details of bio organic compounds and bio inorganic compounds.
CO 3	Students utilize knowledge of antipyretics, analgesic, antiseptics, disinfectants and anesthetics
CO 4	Students analyze the structure of different haem proteins.
CO 5	Students evaluate the different pharmaceutically important compounds and their uses in real life.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
		PO 7	2
CO 5	5	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	1
PSO2	3	1	2	3	2
PSO3	1	2	1	1	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Chromatography	Periods	12
	Chromatography -definition-types- column, paper, thin layer -method of separation application- Difference between paper chromatography and thin layer chromatography. High pressure liquid chromatography- HPLC-principle-experimental techniques - instrumentation and advantages.		
Unit - II	Amino acids and Carbohydrates	Periods	12
	Aminoacids- Preparation- Gabriel method, Strecker synthesis- Isoelectric point, Reactions of glycine. Polypeptide- Proteins- Classification- primary structure and its functions. Carbohydrates-definition, Classification, Preparation and Reactions of glucose and fructose- Inter conversion of glucose to fructose and vice versa- sucrose and starch		
Unit - III	Bio-inorganic Chemistry	Periods	12
	Structure of chlorophyll, porphyrin unit and photosynthesis. Nitrogen fixation, carbon cycle. structure of haem proteins: haemoglobin, myoglobin. Oxygen transport and respiration. Metallo enzymes, vitamins containing metals.		
Unit - IV	Pharmaceutical Chemistry-II	Periods	12
	Structure and mode of action: Analgesics and Antipyretics-salicylic acid derivatives-aspirin, p-aminophenol derivatives- para acetamol and ibuprofen. Antiseptic and disinfectants-definition and distinction, crystal violet, acridine. Anaesthetics-definition, classification- local and general, preparation, properties and uses of cocaine and benzo cocaine.		
Unit - V	Organic Analysis	Periods	12
	Qualitative analysis of organic substances: test for saturation and unsaturation; aliphatic & aromatic; acidic and basic nature of organic compound; elements test for N, S and halogens: functional groups like acid, phenol, aldehyde, ketone, carbohydrate, amine, ester, amide and diamide.		
Total Periods			60

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, 50th edition, New Delhi, S. Chand & Co., (2011). R., Sharma L.R., Kalia K.K., Principles of
2	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry 23rd edition. New Delhi, S. Chand & Co., 2004. Applied Chemistry, New Delhi, S. Chand & Co., 2008.
3	V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, 1995.
4	Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, 22nd edition, New Delhi, S. Chand & Co., 2016.
5	Pandey.O.P, Bajpai.D.N., Giri.S., Practical Chemistry, New Delhi, S.Chand & Co, 2012.
References	
1	1. Jayashree Ghosh .S, Fundamental concepts of Applied Chemistry, New Delhi, S. Chand & Co., 2008.
2	2. Sharma.B.K., Industrial chemistry including chemical engineering -16th- Meerut, Krishnaprakasam media. 2011.
E-References	
1	https://www.khanacademy.org/test-prep/mcat/chemical-processes/separations-purifications/a/principles-of-chromatography
2	https://en.wikipedia.org/wiki/Carbohydrate .
3	https://chem.libretexts.org/

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**



Elayampalayam, Tiruchengode-637 205.

Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			2				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U2CHAP01	Allied Chemistry Practicals		3	0	0	5	25	75	100	
COURSE OBJECTIVES	To understand the principles of volumetric analysis. To enable the students to have hands-on training on qualitative analysis of organic									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
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PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students will learn how to conduct a volumetric estimation process precisely. .
CO 2	Students will understand reactions taking place during the experiment.
CO 3	Students will plan, conduct, review and report the experiment
CO 4	The students will learn the nature, significance, and influence of errors and how they may best be avoided or minimized during quantitative examination of a chemical compound. Students will gain knowledge about analysis of organic compounds.
CO 5	Students will evaluate the reactivity of various functional groups.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	5	PO 4	5
		PO 5	4
CO 4	2	PO 6	6
CO 5	5	PO 7	2
		PO 8	4
PSOs	KLs	PO 9	1
PSO 1	3	PO 10	3
		PO 11	3
PSO 2	4	PO 12	2
		PO 13	1
PSO 3	1	PO 14	6
		PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO4	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	2	1
PSO2	1	1	2	1	2
PSO3	2	2	1	2	1

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations	
Indirect	
1. Course End Delivery	

Content of the Syllabus			
Unit - I	Volumetric Estimations-Acidimetry	Periods	9
	1. Estimation of sodium hydroxide-standard sodium carbonate 2. Estimation of Oxalic acid -standard-oxalic acid. 3. Estimation of Hydrochloric acid - standard oxalic acid		
Unit - II	Permanganometry	Periods	9
	1. Estimation of oxalic acid-std-Mohrs salt or ferrous sulphate. 2. Estimation of sodium nitrite-standard oxalic acid. 3. Estimation of ferrous ion.		
Unit - III	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: Aldehydes, Ketones, carboxylic acids.		
Unit - IV	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: aromatic primary amines, phenol, amide, diamide.		
Unit - V	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: Nitro compounds and monosaccharides.		
Total Periods			45

Text Books	
1	1. V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, (1995).
4	
References	
1	.Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).
E-References	
1	1. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
2	2. http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1
3	3. http://amrita.olabs.edu.in/?sub=73&brch=8&sim=116&cnt=1

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			3			
Course Code	Course Name	Periods per Week			Credit	Maximum Marks			
		L	T	P	C	CA	ESE	Total	
18U3CHA03	Allied Chemistry - I		5	0	0	5	25	75	100
COURSE OBJECTIVES	To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. To expose the students to a breadth of experimental techniques using instrumentation.								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,								
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.								
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,								
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,								
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.								
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.								
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.								
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.								
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,								
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students will be known molecular orbital theory and types of interhalogens.
CO 2	Students can understand organic reactions and types of hybridization
CO 3	Students will be enhanced their knowledge towards electrolysis, conductance and buffer solutions.
CO 4	Students will learn the basics of pharmaceutical chemistry.
CO 5	Students will gain knowledge about corrosion and its preventive methods.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	5	PO 4	5
		PO 5	4
CO 4	6	PO 6	6
		PO 7	2
CO 5	3	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO4	1	1	2	2	1	3	1	1	1	1	1	1	1	3	1
CO5	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	1	3
PSO2	3	1	2	1	2
PSO3	1	2	1	1	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Covalent bonding	Periods	12
	Covalent bond-Hybridization-Definition -Salient features-VSEPR theory - Shapes of inorganic molecules such as BF ₃ , H ₂ O, NH ₃ , ClF ₃ and XeF ₂ . Molecular orbital theory - Postulates-bonding,anti bonding and non-bonding molecular orbital-Bond order-MO diagram for H ₂ , He ₂ ,N ₂ ,O ₂ ,F ₂ ,NO and CO		
Unit - II	Organic Reactions	Periods	12
	Classification of reactions-substitution,addition,elimination reactions-explanation.Isomerization, polymerization and condensation definition with examples.Hybridization in methane,ethylene, acetylene.Aromaticity Huckels rule.Electrophilic substitution reactions in benzene - Mechanism of nitration,sulphonation,halogenation and alkylation		
Unit - III	Electrochemistry-I	Periods	12
	Electrolytic conduction-Faradays law of electrolysis-Conductance of electrolytes-Specific conductance,equivalent conductance, molar conductance-variation of molar conductance with dilution - Kohlrausch law and its application-Conductometric titrations-Ostwald dilution law-pH definition Common ion Effect-Buffer solutions - Definition -Henderson equation -Derivation-Indicators-Acid-base Indicators		
Unit - IV	Pharmaceutical Chemistry-I	Periods	12
	Antibiotics-Definition, classification - broad and narrow spectrum antibiotics. penicillin, chloramphenicol and erythromycin-structure and mode of action structure elucidation not needed. Sulpha drugs - preparation of sulphaguanidine, sulphapyridine and sulphathiazole. Mechanism and mode of action of sulpha drugs		
Unit - V	Applied Chemistry-I	Periods	12
	Corrosion-Types of corrosion - Dry and Wet corrosion definition only-Prevention of corrosion by electroplating. Paints - Requirements of good paint- constituents of paints and their functions- manufacture of paints -special paints: luminescent fire retardant and heat resistant paints. Varnishes -Constituents, characteristics of good varnish, types and uses.		
Total Periods			30

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition, Vishal publishing co., 2017.
2	Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, 22nd edition, New Delhi S. Chand & Co., 2016.
3	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry , 47th edition, Vishal publishing co., 2017.
References	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 50th edition, New Delhi, S. Chand & Co., 2011.
2	Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry 23rd edition, New Delhi, S. Chand & Co., 2004.
E-References	
1	https://chem.libretexts.org/Core/Physical_and_Theoretical_Chemistry/Chemical_Bonding/Molecular_Orbital_Theory/MO_bonding_in_F2_and_O2 .
2	https://www.cliffsnotes.com/study-guides/chemistry/organic-chemistry-ii/reactions-of-aromatic-compounds/electrophilic-aromatic-substitution-reactions

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			4				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U4CHA04	Allied Chemistry - II		5	0	0	5	25	75	100	
COURSE OBJECTIVES	To gain knowledge about coordination compounds and natural products such as amino acids and carbohydrates. Acquire the knowledge about medicinal drugs and dyes									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.									
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students will learn the basic concepts of coordination compounds and its applications.
CO 2	Students will know about the aminoacids,proteins and carbohydrates.
CO 3	Students will gain knowledge regarding electrode potential and batteries.
CO 4	Students will enhance their knowledge towards pharamaceutical and industrial chemistry.
CO 5	Students will dyes and its importance.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
		PO 7	2
CO 5	4	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	2
PSO2	1	1	2	3	3
PSO3	2	2	1	1	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Coordination compounds	Periods	12
	Addition compounds-double salts and complexes. Complexes Mononuclear complexes only) General aspects-central metal atom,Ligand-types of ligands.Coordination number and oxidation state of central metal atom-Nomenclature-Theories of Complexes- Werners theory,Sidgwick theory,EAN rule,VBT-its applications to $[\text{Cu}(\text{NH}_3)_4]^{2+}$, $[\text{Ni}(\text{CO})_4]$, $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoCl}_6]^{3-}$ Chelation-Meaning examples – EDTA applications.		
Unit - II	Amino acids and Carbohydrates	Periods	12
	Aminoacids - Preparation - Gabriel method, Strecker synthesis-Isoelectric point,Reactions of glycine.Polypeptide-Proteins - Classification-primary structure and its functions.Carbohydrates - definition,Classification,Preparationand Reactions of glucose and fructose-Inter conversion of glucose to fructose and vice versa-sucrose and starch		
Unit - III	Electrochemistry-II	Periods	12
	Cells-Galvanic cell with examples.Electrode potential-single electrode potential- Standard electrode potential-Nernt equation-derivation-electrochemical series and its applications- EMF-Applications of EMF measurements:Determination of pH by using hydrogen electrode- Reference electrodes:hydrogen electrode and calomel electrode-Reversible and irreversible cell-Batteries-definitio - lead acid battery		
Unit - IV	Pharmaceutical Chemistry-II	Periods	12
	Structure and mode of action: Analgesics and Antipyretics-salicylic acid derivatives-aspirin, p-aminophenol derivatives- paracetamol and ibuprofen. Antiseptic and disinfectants-definition and distinction, crystal violet, acridine. Anaesthetics - definition, classification-local and general, preparation,properties and uses of cocaine and benzo cocaine		
Unit - V	Applied Chemistry-II	Periods	12
	Dyes-definition-requisites of a true dye, classification of dyes - based on structure and mode of application, colours and chemical constitution-Witts theory, Bayer theory. Dyeing forces-ionic interactions, hydrogen bonds, vander-waals interaction, covalent bonds with examples, cross dyeing - principle only. Basic operations in dyeing process-preparation of fiber and dye bath, applications of dye and finishing		
Total Periods			30

Text Books	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition, Vishal publishing co., 2017.
2	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition, Vishal publishing co. 2017.
References	
1	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition, Vishal publishing co., 2017.
2	Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry 33rd edition Vishal publishing co., 2017.
E-References	
1	https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/carbhyd.htm
2	http://dyes-pigments.standardcon.com/what-is-dye.html



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry		Semester			2				
Course Code	Course Name		Periods per Week			Credit	Maximum Marks			
			L	T	P	C	CA	ESE	Total	
18U4CHAP01	Allied Chemistry Practicals		3	0	0	5	25	75	100	
COURSE OBJECTIVES	To understand the principles of volumetric analysis. To enable the students to have hands-on training on qualitative analysis of organic									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,									
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,									
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.									
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,									
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,									
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.									
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.									
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.									
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.									
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.									
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,									
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,									
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,									
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,									

COs	COURSE OUTCOME
CO 1	Students will learn how to conduct a volumetric estimation process precisely. .
CO 2	Students will understand reactions taking place during the experiment.
CO 3	Students will plan, conduct, review and report the experiment
CO 4	The students will learn the nature, significance, and influence of errors and how they may best be avoided or minimized during quantitative examination of a chemical compound. Students will gain knowledge about analysis of organic compounds.
CO 5	Students will evaluate the reactivity of various functional groups.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	5	PO 4	5
		PO 5	4
CO 4	2	PO 6	6
CO 5	5	PO 7	2
		PO 8	4
PSOs	KLs	PO 9	1
PSO 1	3	PO 10	3
		PO 11	3
PSO 2	4	PO 12	2
		PO 13	1
PSO 3	1	PO 14	6
		PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO4	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO5	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	2	1
PSO2	1	1	2	1	2
PSO3	2	2	1	2	1

Course Assessment Methods

Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Volumetric Estimations-Acidimetry	Periods	9
	1. Estimation of sodium hydroxide-standard sodium carbonate 2. Estimation of Oxalic acid -standard-oxalic acid. 3. Estimation of Hydrochloric acid - standard oxalic acid		
Unit - II	Permanganometry	Periods	9
	1. Estimation of oxalic acid-std-Mohrs salt or ferrous sulphate. 2. Estimation of sodium nitrite-standard oxalic acid. 3. Estimation of ferrous ion.		
Unit - III	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: Aldehydes, Ketones, carboxylic acids.		
Unit - IV	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: aromatic primary amines, phenol, amide, diamide.		
Unit - V	Qualitative Organic Analysis	Periods	9
	Systematic analysis of organic compounds: Characterization of Organic compounds by their functional groups and confirmation by preparation of derivative. Functional groups that may be studied: Nitro compounds and monosaccharides.		
Total Periods			45

Text Books

1	1. V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu, Basic Principles of Practical Chemistry, New Delhi, S. Chand & Co, (1995).
4	

References

1	.Pandey O. P, Bajpai D. N., Giri S., Practical Chemistry, New Delhi, S.Chand & Co, (2012).
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E-References

1	1. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
2	2. http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1
3	3. http://amrita.olabs.edu.in/?sub=73&brch=8&sim=116&cnt=1

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019			
Department	Chemistry			Semester			3			
Course Code	Course Name			Periods per Week			Credit		Maximum Marks	
				L	T	P	C	CA	ESE	Total
18U3CHN01	Industrial Chemistry			3	0	0	2	25	75	100
COURSE OBJECTIVES	To learn the importance of water chemistry To understand the manufacturing of soaps, detergents and glass of different types To enable the students to learn about the preparation and importance of various industrial products									
POs	PROGRAMME OUTCOME									
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.									
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself etc.,									

PO 3	Capability to apply analytic thought to a body of knowledge;analyse and evaluate evidence,arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.
PO 5	Ability to evaluate the reliability and relevance of evidence;identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group,and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
PO 10	Capability to use ICT in a variety of learning situations,demonstrate ability to access, valuate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,

COs	COURSE OUTCOME
CO 1	Students will be known the various methods involved in water quality analysis
CO 2	Students can understand the manufacture of soap and detergents.
CO 3	Students will be enhanced their knowledge towards manufacture of glass.
CO 4	Students will learn the basic concepts involved in lubricants. Students will gain knowledge about petroleum products
CO 5	Students will learn how to conduct a volumetric estimation process precisely
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
CO 5	4	PO 7	2
		PO 8	4
PSOs	KLs	PO 9	1
PSO 1	3	PO 10	3
		PO 11	3
PSO 2	4	PO 12	2
		PO 13	1
PSO 3	1	PO 14	6
		PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	2
PSO2	1	1	2	3	3
PSO3	2	2	1	1	1

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations	
Indirect	
1. Course End Delivery	

Content of the Syllabus			
Unit - I	Water chemistry- I	Periods	6
	Examination of water quality by chemical and physical examination of water: colour - turbidity - odour-taste-temperature-pH-electrical conductivity-suspended solids - dissolved solids - acidity-total acidity-alkalinity - free CO ₂ - dissolved O ₂ -free chlorine-chlorine demand - BOD -COD.		
Unit - II	Soaps and detergents	Periods	6
	Soaps:manufacture-toilet and transparent soap -metal soaps,cleansing action of soap. Detergents:Manufacture of synthetic detergents-anionic detergents-cationic detergents and amphoteric detergents		
Unit - III	Glass industry	Periods	6
	Glass-physical and chemical properties of glass-characteristics-manufacture: formation of batch material-melting-shaping-annealing-finishing-special glass:optical,borosilicate and coloured glass		
Unit - IV	Lubricants	Periods	6
	Definition-functions - properties - viscosity index-pour point - cloud point - classification - additives for lubricants- grease-solid lubrication-emulsions		
Unit - V	Petroleum and Petrochemicals	Periods	6
	Cracking - mechanism,changes occurring during cracking - types - applications - synthetic petrol - Hydrogenation of coal Bergius process - Fischer tropsh process - knocking and anti knocking agents - octane number		
Total Periods			30

Text Books	
1	Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi,1981.
2	Industrial chemistry by B.K.Sharma,Goel Publishing House, Meerut.
4	
References	
1	College Industrial chemistry by P.P.Singhn, T.M.Joseph, R.G.Dhanvale, Himalaya Publishing house, Bombay 4th edition, 1983
2	Applied chemistry by Jayashree Ghosh, S.Chand Publication Reprint 2013
E-References	
1	https://www.scribd.com/document/274281762/Water-Technology-Ppt
2	nptel.ac.in/courses/103107082/module6/lecture5/lecture5.pdf

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			3			
Course Code	Course Name	Periods per Week		Credit	Maximum Marks				
		L	T	P	C	CA	ESE	Total	
18U3CHN02	Medicinal Chemistry		3	0	0	2	25	75	100
COURSE OBJECTIVES	1.To study the system of Indian medicines 2.To learn the importance and evaluation of drugs. 3.To prepare and analyse the drugs.								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
PO 3	Capability to apply analytic thought to a body of knowledge;analyse and evaluate evidence,arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,								
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.								
PO 5	Ability to evaluate the reliability and relevance of evidence;identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,								
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,								
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group,and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.								
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.								
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.								
PO 10	Capability to use ICT in a variety of learning situations,demonstrate ability to access, valuate, and use a variety of relevant information sources; and use appropriate software for analysis of data.								
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,								
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students known the systems of Indian medicines
CO 2	Students able to understand the drugs.
CO 3	Students enhanced their knowledge towards preparation of drugs.
CO 4	Students learn the importance of medicinal plants.
CO 5	Students know to analyse the drug and its quality.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	3	PO 4	5
		PO 5	4
CO 4	4	PO 6	6
CO 5	4	PO 7	2
		PO 8	4
PSOs	KLs	PO 9	1
PSO 1	3	PO 10	3
		PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO4	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	3	2	2
PSO2	1	1	2	3	3
PSO3	2	2	1	1	1

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations	
Indirect	
1. Course End Delivery	

Content of the Syllabus			
Unit - I	Introduction to Pharmacognosy	Periods	6
	History, Definition and scope of pharmacognosy; Systems of Indian Medicines - Siddha, Unani, Ayurveda, Homeopathy; Terminologies.		
Unit - II	Classification of drugs	Periods	6
	Classification of Crude drugs - Taxonomical, Morphological, Pharmacological and chemical classifications; Chemistry of drugs and its evaluation.		
	Preparation and Application of Drugs	Periods	6
Unit - III	Preparation of crude and commercial drugs. Making infusion, decoction, lotion, washers, insect repellents, suppositories, tincture, making herbal syrups, compresses, poultice, plasters, ointments, herbal oils and herbal salves. Surgical fibres, sutures and dressing.		
Unit - IV	Plants as Drugs	Periods	6
	Organoleptic study of the following medicinal plants: Fruit - Amla, Bulb - Garlic, Rhizome - Ginger, seed - castor, Bark - Cinchona, Leaves - Neem, Flower - Clove.		
	Analytical Studies	Periods	6
Unit - V	Analytical Pharmacognosy - drug adulteration and detection. Biological testing of herbal drug. Phytochemical investigations with reference to secondary metabolites of locally available medicinal plants.		
	Total Periods		30

Text Books	
1	S.Lakshmi, Pharmaceutical Chemistry, S.Chand & Sons ,New Delhi,2004.
2	V.K.Ahluwalia and Madhu Chopra, Medicinal Chemistry ,Ane Books,New Delhi,Reprint 2009.
3	Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi, 1981.
4	Industrial chemistry by B.K.Sharma, Goel Publishing House, Meerut.
References	
1	Pharmacognosy, S.B.Gokhale, Dr.C.K. Kokate, A.P. Purohit, Publisher: Nirali Prakasham, Pune, 2002
2	Herbs that Heal, Acharya Vipul Rao â€œ Diamond Pocket Books, New Delhi, 2005
3	Practical Pharmacognosy. Dr.C.K. Kokate et al. 2003
4	An Introduction to Medicinal Botany and Pharmacognosy â€œ N.C. Kumar, Emkay Publications, New Delhi, 2004.
E-References	
1	https://www.doccity.com/en/classification-of-crude-drugs/2147112/
2	https://link.springer.com/content/pdf/10.1007%2F978-3-319-63862-1.pdf

Signature of BOS Chairman



**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)**

Elayampalayam, Tiruchengode-637 205.



Programme	B.Sc	Programme Code	UCH			Regulations	2018-2019		
Department	Chemistry		Semester			3			
Course Code	Course Name	Periods per Week			Credit	Maximum Marks			
		L	T	P	C	CA	ESE	Total	
18U3CHN03	Water Quality Analysis		3	0	0	2	25	75	100
COURSE OBJECTIVES	1.To study the characteristics of water 2.To learn the importance of water purification 3.To analyse the quality measurement about water								
POs	PROGRAMME OUTCOME								
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.								
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,								
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,								
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.								
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,								
PO 6	A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses etc.,								
PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.								
PO 8	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.								
PO 9	Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.								
PO 10	Capability to use ICT in a variety of learning situations, demonstrate ability to access, value, and use a variety of relevant information sources; and use appropriate software for analysis of data.								
PO 11	Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.								
PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,								
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,								
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,								
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,								

COs	COURSE OUTCOME
CO 1	Students knew the various sources of water.
CO 2	Students able to understand the importance of various water quality parameters.
CO 3	Students able to determine the hardness of water.
CO 4	Students knowledge on sources, analysis and control methods of industrial waste water .
CO 5	Students learn how to treat polluted water.
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	2	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	5	PO 4	5
		PO 5	4
CO 4	3	PO 6	6
		PO 7	2
CO 5	4	PO 8	4
		PO 9	1
PSOs	KLs	PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO4	2	1	1	1	2	1	2	2	1	3	3	2	1	1	3
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	3	2
PSO2	1	1	2	2	3
PSO3	2	2	1	1	1

Course Assessment Methods



Direct
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations
Indirect
1. Course End Delivery

Content of the Syllabus

Unit - I	Introduction to Hydrology	Periods	6
	World water resource; water resources of India- Different ecosystem of hydrology- Riverine, Estuarine and marine-Status of water quality in India.		
Unit - II	Characteristics of Water	Periods	6
	Water quality parameters and their interaction-physical and chemical characteristics- colour, odour, taste, turbidity, temperature-chemical constituents- electrical conductivity - suspended solids - dissolved solids - acidity - total acidity - alkalinity - pH - free CO ₂ - dissolved O ₂ - free chlorine - chlorine demand.		
Unit - III	Water Treatment	Periods	6
	Water composition analysis - Hardness of water- Type of Hardness-Determination of hardness by EDTA method, Removal of hardness-Zeolite process, demineralization and Reverse osmosis - Salinity - ionic composition - Minerals-pollutants- BOD, COD- Water quality standard - ISI, EPA, WHO.		
Unit - IV	Industrial Water Pollution, Its Control & Analysis	Periods	6
	Sources of water pollution - domestic - industrial - agricultural - soil and radioactive wastes as sources of pollution. Water pollutants and their effects. Heavy metal pollution-public health significance of Cadmium - Chromium - Copper - Lead - Zinc - Manganese. Prevention and control its measures.		
Unit - V	Industrial Waste Water Treatment	Periods	6
	Aerobic treatment; Suspended growth aerobic treatment processes; Activated sludge process and its modifications; Attached growth aerobic processes; Tricking filters and Rotating biological contactors; Anaerobic treatment; suspended growth, attached growth, fluidized bed and sludge blanket systems; nitrification, denitrification; Phosphorus removal.		
Total Periods			30

Text Books	
1	B. K. Sharma, Industrial Chemistry; 8th Ed., Goel Publishing House, New Delhi, 1997.
2	B.K. Sharma and H. Kaur, "Environmental chemistry", Goel Publishing House, Meerut, 2008
3	Industrial chemistry by B.N.Chakrabarty, Oxford and IBH publishing Co, NewDelhi, 1981.
4	Industrial chemistry by B.K.Sharma, Goel Publishing House, Meerut.
References	
1	Chemical Process Industries Norrish Shreve, R. and Joseph A. Brink Jr. McGraw Hill, Industrial Book Company, London.
2	Production and Properties of Industrial Chemicals " Brain A.C.S. Reinhold" NewYork.
3	Outlines of Chemical Technology " For the 21st Century M. Gopala Rao & Matshall Sittig (3rd Edition)
4	College Industrial chemistry by P.P.Singhn, T.M.Joseph, R.G.Dhanvale, Himalaya Publishing house, Bombay 4th edition, 1983.
5	Applied chemistry by Jayashree Ghosh, S.Chand Publication Reprint 2013
E-References	
1	https://www.cdc.gov/healthywater/drinking/public/water_treatment.html
2	https://www.hunterwater.com.au

Signature of BOS Chairman

	VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN (AUTONOMOUS) Elayampalayam, Tiruchengode-637 205.							
Programme	B.Sc	Programme Code	UCH		Regulations	2018-2019		
Department	Chemistry		Semester			4		
Course Code	Course Name	Periods per Week			Credit	Maximum Marks		
		L	T	P	C	CA	ESE	Total
18U4CHN04	FOOD AND NUTRITION	2	NIL	NIL	2	25	75	100
COURSE OBJECTIVES	1. To provide energy for doing works. 2. To protect the human beings from infections and deficiency disorders. 3. To increase knowledge on food and nutrition security concepts at the national and sub-national levels.							
POs	PROGRAMME OUTCOME							
PO 1	Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.							
PO 2	Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share ones views and express herself/himself etc.,							
PO 3	Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications etc.,							
PO 4	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply ones learning to real life situations.							
PO 5	Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesis data from a variety of sources; draw valid conclusions etc.,							
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PO 7	Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.							
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PO 12	Possess knowledge of the values and beliefs of multiple cultures and a global perspective etc.,							
PO 13	Ability to embrace moral/ethical values in conducting ones life, formulate a Position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work etc.,							
PO 14	Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating etc.,							
PO 15	Ability to acquire knowledge and skills, including learning how to learn, that are necessary for participating in learning activities throughout life, through self-paced etc.,							

COs	COURSE OUTCOME
CO 1	Students will gain knowledge in describing general nutritional components emphasizing regulation of dietary carbohydrates, fat, and protein metabolism and their impact on nutritional status and health.
CO 2	Students will evaluate others aspects of food quality.
CO 3	Students can impact of food preservation, processing, packaging and distribution on food quality.
CO 4	Students produce a variety of food products applying principles of food handling and preparation
CO 5	Students can give an overview of the main classes of compounds influencing color and flavor of food and have knowledge on important sources of vitamins and minerals in food
Pre-requisites	

Knowledge Levels

1.Remembering, 2.Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6.Synthesizing

CO / PO / KL Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	KLs	POs	KLs
CO 1	4	PO 1	2
CO 2	2	PO 2	1
		PO 3	5
CO 3	6	PO 4	5
		PO 5	4
CO 4	5	PO 6	6
CO 5	4	PO 7	2
		PO 8	4
PSOs	KLs	PO 9	1
		PO 10	3
PSO 1	3	PO 11	3
		PO 12	2
PSO 2	4	PO 13	1
		PO 14	6
PSO 3	1	PO 15	3

CO / PO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	PROGRAMME OUTCOME (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
CO1	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2
CO2	3	2	1	1	1	1	1	1	2	2	2	3	2	1	2
CO3	1	1	2	2	1	3	1	1	1	1	1	1	1	3	1
CO4	1	1	3	3	2	2	1	2	1	1	1	1	1	2	1
CO5	1	1	2	2	3	1	1	3	1	2	2	1	1	1	2

CO / PSO Mapping

(3/2/1 indicates the strength of correlation, 3-strong, 2-medium, 1-weak)

COs	Programme Specific Outcome (POs)				
	CO1	CO2	CO3	CO4	CO5
PSO1	2	2	1	1	2
PSO2	3	1	1	2	3
PSO3	1	2	1	1	1

Course Assessment Methods	
Direct	
1. Continuous Assessment Test I, II & Model 2. Assignment 3. End Semester Examinations	
Indirect	
1. Course End Delivery	

Content of the Syllabus			
Unit - I	Food Sources	Periods	6 hours
	Introduction-types-sources-nutrients of foods: carbohydrate, protein, fats, oils - functions of food.		
Unit - II	Food Poisoning and Adulteration	Periods	6 hours
	Food poisoning: Sources, causes and remedy- Food adulteration: Types, common adulteration in food.		
Unit - III	Food Preservation and Processing	Periods	6 hours
	Importance of food preservation- principles of food preservation -Food spoilage, causes of food spoilage - types of Food spoilage - preservation and processing by heating: sterilisation, pasterusation.		
Unit - IV	Vitamins	Periods	6 hours
	Definition-types-functions, Sources, deficiency diseases of A, C, K, E and B1,B12,B6.		
Unit - V	Minerals	Periods	6 hours
	Mineral elements in food - source and daily requirements of ca, Na, K, Mg, Fe and P.		
Total Periods			30 hours

Text Books	
1	Sumati R.Mudambi, M.V.Rajagopal, Fundamentals of Foods and nutrition, Fourth edition 2003, New Age International Publishers, New Delhi .
2	. M.Swaminathan, Handbook of Food and Nutrition, The Bangalore printing and publishing Co.,Ltd, Bangalore.
References	
1	N.Shaguntala Manay, M.shadaksharaswamy, Foods Facts and Principles, second edition, New Age International Publishers, New Delhi .
2	B.Srilakshmi, Food Science, Second edition, New Age International Publishers, New Delhi.
3	Dr.Kusum Gupta, Dr.L.C.Gupta, Abhishek Gupta, Food and Nutrition, Fourth edition, Jaypee Brothers medical publishers, New Delhi.
E-References	
1	https://Foodandnutrition.net
2	https://www.edx.org

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