

**BACHELOR OF SCIENCE  
IN  
CHEMISTRY**

**CURRICULUM AND SYLLABUS  
(FOR STUDENTS ADMITTED FROM  
ACADEMIC YEAR 2021-2022 ONWARDS)**

**UNDER CHOICE BASED CREDIT SYSTEM**



**DEPARTMENT OF CHEMISTRY  
CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)  
Nationally Re-Accredited (III Cycle) with 'A' grade (CGPA-3.41 out of 4)  
by NAAC  
TIRUCHIRAPPALLI -620 018**

## **B.Sc. CHEMISTRY PROGRAMME EDUCATION OBJECTIVE**

- ❖ Impart functional knowledge of all basic areas of chemistry which continue to develop throughout the life time.
- ❖ Profitable Employment in Private/Government/professional sectors appropriate to their interest, education and become a dynamic individual.
- ❖ Interdisciplinary approach helps in creating innovative ideas for the sustainable development.
- ❖ Develop leadership qualities in multi-disciplinary setting through ethical manner.
- ❖ Ability to identify and find the solutions to socio-economic environmental problems for the development of the country.

## **PROGRAMME OUTCOMES**

- ❖ Curriculum enhances the basic concepts, skills in problem solving, critical thinking and analytical reasoning in chemistry.
- ❖ Explore the new area of research with innovative ideas in novel chemistry and other scientific fields.
- ❖ Specific placement in R & D, chemical, pharmaceuticals, food products and life Oriented material industries.
- ❖ Crop up all the competitive group examinations.
- ❖ Imbibed ethical, moral and social values in personal life leading to highly cultured and civilized personality.

**CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)**  
**B.SC., CHEMISTRY COURSE STRUCTURE**  
**UNDER CHOICE BASED CREDIT SYSTEM**  
**(For the candidates admitted from the academic year 2020-2021)**

Sem	Part	Course	Title	Subject code	Inst Hrs/ week	Credit	Exam Hrs	Marks		Total
								INT	EXT	
V	III	Core Course-V (CC)	Inorganic Chemistry-I	19UCH5CC5	5	5	3	25	75	100
		Core Course- VI (CC)	Organic Chemistry-I	19UCH5CC6	5	5	3	25	75	100
		Core Course-VII (CC)	Physical Chemistry-I	19UCH5CC7	6	5	3	25	75	100
		Core Practical- V (CP)	Physical Chemistry (P)	19UCH5CC5P	3	3	3	40	60	100
		Major Based Elective-I	Nuclear and Industrial Chemistry	20UCH5MBE1A/	5	5	3	25	75	100
			Basics of Nanoscience and Nanotechnology	20UCH5MBE1B						
	IV	Skill Based Elective-II	Chemistry of Consumer Products (P) /	19UCH5SBE2AP	2	2	3	40	60	100
			Dye Chemistry (P)	19UCH5SBE2BP						
		Skill Based Elective-III	Water Analysis (P)/	20UCH5SBE3AP	2	2	3	40	60	100
			Biofuels (P)	19UCH5SBE3BP						
		UGC Jeevan Kaushal Life Skills	Professional Skills	19UGPS	2	2	3	25	75	100
	V	Extra Credit Course	Swayam Online Course	To be fixed later	As per UGC recommendations					
	<b>Total</b>				<b>30</b>	<b>29</b>				<b>800</b>

VI	III	Core Course – VIII (CC)	Organic Chemistry - II	19UCH6CC8	6	5	3	25	75	100
		Core Course –IX (CC)	Physical Chemistry - II	19UCH6CC9	6	5	3	25	75	100
		Core Practical – VI (CP)	Gravimetric Analysis and Physical Parameter (P)	20UCH6CC6P	4	4	4	40	60	100
		Major Based Elective – II	A. Analytical Chemistry Techniques (P)	20UCH6MBE2AP	3	3	3	40	60	100
			B. Analysis of Herbal Medicine (P)	20UCH6MBE2BP						
		Major Based Elective –III	A. Polymer Chemistry	19UCH6MBE3A	5	5	3	25	75	100
			B. Pharmaceutical Chemistry	19UCH6MBE3B						
		Project	Project Work	20UCH6PW	5	3	-	-	100	100
	V	Gender Studies	Gender Studies	19UGGS	1	1	3	25	75	100
		Extension activity		19UGEA	0	1	0	-	-	-
		<b>Total</b>			<b>30</b>	<b>27</b>				<b>700</b>

**Language Part – I - 4**

**English Part –II - 4**

**Core Paper - 9**

**Core Practical - 6**

**Allied Paper - 5**

**Allied Practical - 1**

**Non-Major Elective - 2**

**Skill Based Elective - 3**

**Major Based Elective - 3**

**Environmental Studies - 1**

**Value Education - 1**

## **Professional Skills - 1**

## **Project Work - 1**

## **Gender Studies - 1**

## **Extension Activities - 1**

\*\* Extension Activities shall be outside instruction hours

### **1. Non-Major Elective I & II – for those who studied Tamil under Part I**

- a) Basic Tamil I & II for other language students
- b) Special Tamil I & II for those who studied Tamil upto 10th or +2 but opt for other languages in degree programme

### **2. Practical**

Internal : 40

External : 60

### **3. Separate passing minimum is prescribed for Internal and External marks**

#### **FOR THEORY**

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

#### **FOR PRACTICAL**

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

**CORE COURSE-V**  
**INORGANIC CHEMISTRY-I**

<b>Semester-V</b>	<b>INORGANIC CHEMISTRY-I</b>	<b>Hours/Week-5</b>	
<b>Core Course-V</b>		<b>Credit-5</b>	
<b>Course Code-19UCH5CC5</b>		<b>Internal</b>	<b>External</b>
		<b>25</b>	<b>75</b>

**Objectives**

- To understand the concept of metallurgy
- To understand the basics and theories of coordination compounds.
- To study biologically important coordination compounds.

**Course Outcomes**

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

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	Explain the process of metallurgy.	K1
<b>CO2</b>	Recognize the basic concepts of co-ordination chemistry.	K1
<b>CO3</b>	Compare the theories of bonding in coordination compounds.	K2
<b>CO4</b>	Relate the stability of metal complexes.	K3
<b>CO5</b>	Interpret the biological importance of coordination complexes.	K3

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	S	M	M	S	M
<b>CO2</b>	M	M	S	M	S
<b>CO3</b>	M	M	M	S	S
<b>CO4</b>	M	M	S	S	M
<b>CO5</b>	M	M	M	M	M

**S- Strong; M- Medium**

## **CORE COURSE-V INORGANIC CHEMISTRY-I**

### **Unit – I Metallurgy**

**(15 Hrs)**

Metallurgy - minerals and ores - process - ore dressing - gravity separation - froth flotation - magnetic separation - chemical separation- calcination - roasting. Extraction of metal - chemical reduction - auto reduction - electrolytic reduction - metal displacement- refining methods - Van Arkel method - electrolytic refining - vapour phase refining-ion exchange method. Thermodynamic principles of metallurgy-Ellingham diagram - observations - applications.

### **Unit - II Coordination Compounds –I**

**(15 Hrs)**

Introduction - types of ligands- coordination number - nomenclature of coordination compounds – isomerism - structural isomerism - stereo isomerism - bonding theories -Werner's theory - Sidgwick's concept of coordination - Valence bond theory – postulates of VBT- geometries of tetrahedral - square planar and octahedral complexes - limitations.

### **Unit - III Coordination Compounds –II**

**(15 Hrs)**

Crystal field theory - shapes of d orbitals- assumptions- splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes -crystal field stabilization energy- factors affecting magnitude of  $10 Dq$  - merits and demerits of crystal-field theory – spectro chemical series –Jahn -Teller effect– MOT – octahedral complexes.

### **Unit - IV Stability and Magnetic Properties of Metal Complex**

**(15 Hrs)**

Stability of metal complexes- thermodynamic stability and kinetic stability-factors affecting the stability of metal complexes- chelate effect - determination of composition of complex by Job's method - mole ratio method -properties of metal complexes-types of magnetic behavior-spin-only formula - calculation of magnetic moments - experimental determination of magnetic susceptibility - Gouy method.

### **Unit -V Reactivity of Metal Complexes and Bio-Inorganic Chemistry**

**(15 Hrs)**

Reactivity of metal complexes-labile and inert complexes- ligand substitution reactions -  $SN_1$  and  $SN_2$  substitution reactions of square planar complexes - Trans effect – Theories - applications. Bioinorganic chemistry - essential elements - biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl – metallo porphyrin's – structure - functions of hemoglobin- myoglobin - chlorophyll.

### Text Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Puri B.R., Sharma L.R, Kalia K.K.	1993	Principles of Inorganic Chemistry (23 <sup>rd</sup> edition)	Shoban Lal Nagin Chand & Co., New Delhi
2	Gopalan R.	2012	Text Book of Inorganic Chemistry (2 <sup>nd</sup> edition)	Hyderabad, Universities Press, India
3	Soni P.L.	1993	Text Book of Inorganic Chemistry (20 <sup>th</sup> revised edition)	Sultan Chand & Sons
4	Gilreath,	1985	Fundamental Concepts of Inorganic Chemistry (18 <sup>th</sup> Printing)	McGraw Hill International Book Company

### Reference Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Madan R.D	2000	Modern Inorganic Chemistry (2 <sup>nd</sup> edition)	S. Chand & Company Ltd.,
2	Wahid U.Malik Tuli G.D, Madan R.D	2001	Selected topics in inorganic Chemistry (7 <sup>th</sup> edition)	S.Chand and Company Ltd.,
3	Cotton F.A	2004	Advanced Inorganic Chemistry (6 <sup>th</sup> edition)	John Wiley & Sons, Pvt. Ltd.,
4	Huheey J.E.	1993	Inorganic Chemistry (4 <sup>th</sup> edition)	Pearson Education. Inc.,



**Pedagogy**

Lecture, Lecture with discussion, Demonstrations, Group discussion, Debate, Seminar, Quiz, Video clippings, Flip learning, and E-Content

**Course Designers**

**Dr. V. Sangu**, Assistant Professor, Department of Chemistry

**Ms. P. Thamizhini**, Assistant Professor, Department of Chemistry

**CORE COURSE - VI**  
**ORGANIC CHEMISTRY –I**

<b>Semester -V</b>	<b>ORGANIC CHEMISTRY –I</b>	<b>Hours/Week-5</b>	
<b>Core Course-VI</b>		<b>Credit-5</b>	
<b>Course Code -19UCH5CC6</b>		<b>Internal</b>	<b>External</b>
		<b>25</b>	<b>75</b>

**Objectives**

- This course helps to learn the reactions of carboxylic acids, amines, carbonyl compounds and Heterocyclic compounds.
- To know the requirement of the oxidizing and reducing agents for synthesis

**Course Outcomes**

On successful completion of the course, the student will be able to

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge level</b>
<b>CO 1</b>	Identify different types of carboxylic acids and to compare their relative strength	K1
<b>CO 2</b>	Discuss about reactions of carbonyl compounds	K2
<b>CO 3</b>	Explain various heterocyclic compounds and dyes	K2
<b>CO 4</b>	Utilization appropriate reagents for oxidization and reduction	K3
<b>CO 5</b>	Analyze the basicity and stability of aliphatic and aromatic amines	K4

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO 1</b>	S	S	M	S	M
<b>CO2</b>	S	S	M	S	S
<b>CO3</b>	S	S	S	M	S
<b>CO4</b>	S	S	S	S	M
<b>CO5</b>	S	S	S	S	M

**S-Strong M-Medium**

**CORE COURSE - VI**  
**ORGANIC CHEMISTRY –I**

**Unit –I Carboxylic Acid and Their Derivatives (15 Hrs)**

Aliphatic acids: Saturated monocarboxylic acid – resonance structure – relative strength of carboxylic acids (effect of substituents). Reactive methylene compounds: Preparation- properties - uses of ethylacetoacetate and diethyl malonate. Aromatic acids: Monocarboxylic acids – general methods of preparation - properties and reactions of benzoic acid and salicylic acid. Dicarboxylic acid: Preparation - properties - uses of phthalic acid and terephthalic acid.

**Unit -II Chemistry of Nitrogen Compounds (15 Hrs)**

Amines: aliphatic and aromatic amines - classification – general methods of preparation- properties and reaction - separation of mixture of amines. Basicity of amines - effect of substituents - distinction between primary, secondary and tertiary amine. Aliphatic diazo compounds: Preparation - properties of diazomethane. Diazonium compounds: Benzene diazonium chloride – structure - reactions - synthetic applications of diazo coupling reaction.

**Unit –III Carbonyl Compounds - Aldehydes and Ketones (15 Hrs)**

Structure - acidity of  $\alpha$ -hydrogen – methods of preparation- physical properties - chemical properties - nucleophilic addition - acid- base catalyzed reaction –. addition reactions – sodium bisulphate- hydrogen cyanide- ammonium ion. Oxidation reaction – Oxidation of aldehydes and ketones. Reduction reaction – reduction to alcohol and alkane using Grignard reagent and  $\text{LiAlH}_4$ . Aldol condensation - Benzoin condensation - Cannizaro reaction - Reformatsky and Wittig reaction.

**Unit – IV Heterocyclic Compounds and Dyes (15 Hrs)**

Heterocyclic Compounds: Nomenclature – Chemistry of furan- thiophene - pyrrole and pyridine. Fused ring heterocyclic compounds: Quinolone - isoquinoline and indole. Dyes: Introduction – colour and constitution - classification based on structure - application. Preparation and applications of the following dyes – methyl orange- congo red- malachite green and indigo.

**Unit - V Oxidation and Reduction (15 Hrs)**

Oxidation: Osmium tetroxide – chromyl chloride – ozone – DDQ –dioxiranes - lead tetraacetate - selenium dioxide – Dess - Martin reagent. Reduction: Catalytic hydrogenation using Wilkinson catalyst – reduction with  $\text{LiAlH}_4$ -  $\text{NaBH}_4$  –  $\text{AlH}[\text{O t-Bu}]_3$  -  $\text{NaCNBH}_3$  and  $\text{NH}_2\text{-NH}_2$ .

### Text Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Bahl, B.S. and Bahl, A.	2010	Advanced Organic Chemistry (12 <sup>th</sup> edition)	Sultan Chand & Co., New Delhi.
2	Soni P.L.	2006	Text Book of Inorganic Chemistry	S. Chand & Co., New Delhi
3	Bhupinder Mehta and Manju Mehta	2015	Organic Chemistry	Prentice Hall of India Pvt Ltd., New Delhi.

### Reference Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Finar I.L.	1996	Organic Chemistry, Volume 1&2 (6 <sup>th</sup> edition)	Addison Wesley Longman Ltd., England
2	Morrison R.T. and Boyd R.N. and Bhattacharjee S. K.	2011	Organic Chemistry (7 <sup>th</sup> edition),	Pearson India
3	Tewari, K.S, Vishil N.K and Mehotra S.N.	2001	A text book of Organic Chemistry ( 1 <sup>st</sup> edition)	Vikas Publishing House Pvt Ltd., New Delhi
4	Pine S.H.,	1987	Organic Chemistry (5 <sup>th</sup> edition)	McGraw – Hill International Book Company, New Delhi
5.	Seyhan N. Ege	2005	Organic Chemistry (5 <sup>th</sup> edition)	Houghton Mifflin Co., New York

### Pedagogy

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Quiz, Group discussion, Video/Animation.

### Course Designer

**Ms. Pungayee Alias Amirtham**, Assistant Professor and Head, Department of Chemistry

**Ms. A. Sharmila**, Assistant Professor, Department of Chemistry

**CORE COURSE - VII**  
**PHYSICAL CHEMISTRY –I**

<b>Semester -V</b>	<b>PHYSICAL CHEMISTRY –I</b>	<b>Hours/Week-6</b>	
<b>Core Course-VII</b>		<b>Credit-5</b>	
<b>Course Code -19UCH5CC7</b>		<b>Internal</b>	<b>External</b>
		<b>25</b>	<b>75</b>

**Objectives**

- After studying this course students can understand photochemical process and types of electronic transitions, behaviors of dilute solutions and colligative properties, colloids, adsorption phenomena, phase rule and its significances.

**Course Outcomes**

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

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	Evaluate quantum yield and Identify types of electronic transition in organic molecules.	K4
<b>CO2</b>	Find equilibrium constant and enthalpy of equilibrium reaction at different temperature,	K1
<b>CO3</b>	Analyze thermodynamic conditions favoring chemical equilibrium.	K2
<b>CO4</b>	Discuss physical and chemical adsorption phenomenon	K2
<b>CO5</b>	Explain phase rule and law of dilute solution to predict composition, molecular weight	K2

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	S	S	S	S	S
<b>CO2</b>	S	S	S	S	S
<b>CO3</b>	M	M	S	S	S
<b>CO4</b>	S	S	S	S	S
<b>CO5</b>	S	M	M	S	S

**S -Strong , M-Medium , L -Low**

**CORE COURSE - VII**  
**PHYSICAL CHEMISTRY –I**

**Unit - I Electronic Spectroscopy and Photochemistry**

**(18 Hrs)**

Molecular spectra - Energy levels of molecular orbitals - electronic spectroscopy - selection rules - types of electronic transitions - concept of chromophore and auxochrome. Photochemistry: Difference between thermal and photochemical processes- laws of photochemistry - Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence - quantum yield-photochemical reaction mechanism- hydrogen- chlorine, hydrogen- bromine reaction - energy transfer processes - Jablonski diagram- qualitative description of fluorescence, phosphorescence and photosensitized reactions.

**Unit - II Chemical Equilibrium, Zeroth and Third Law Thermodynamics**

**(18 Hrs)**

Law of mass action - thermodynamic treatment - Van't Hoff reaction isotherm, temperature dependence of the equilibrium constant - Van't Hoff equation, integrated form of Van't Hoff equation - homogeneous and heterogeneous systems ( $\text{NH}_3$ ,  $\text{PCl}_5$  and  $\text{CaCO}_3$ ) - relationship between  $K_p$  and  $K_c$  - Factors affecting chemical equilibrium - Le - Chatlier principle (Haber's and Contact processes) - Zeroth law of thermodynamics - absolute temperature scale - statement of third law - Nernst heat theorem.

**Unit -III Dilute Solutions**

**(18 Hrs)**

Ideal solutions, Raoult's law - ideally dilute solutions- Henry's law – non-ideal solutions - vapour pressure - temperature curves – azeotropes – hydrochloric acid- water system- ethanol-water systems and fractional distillation - partially miscible liquids - phenol-water, tri methylamine-water, nicotine-water system- effect of impurity on consolute temperature - immiscible liquids and steam distillation - Nernst distribution law - applications of distribution law. Colligative Properties - relation between molecular weight and elevation in boiling point - depression in freezing point - osmosis - osmotic pressure – determination of osmotic pressure of a non-volatile solute from osmotic pressure - abnormal colligative properties – Van't Hoff factor

**Unit - IV Surface Chemistry**

**(18 Hrs)**

Definition of colloids - solids in liquids (Sols) – preparation – purification - properties – kinetic, optical and electrical - stability of colloids - Hardy Schule law - protective colloids - liquids in liquids (emulsions) – preparation - properties - uses - liquids in solids (gels) – preparation- properties - uses

- adsorption - physical adsorption - chemisorption- Freundlich and Langmuir adsorption isotherms - applications of adsorption.

### Unit – V Phase Rule

(18 Hrs)

Concept of phase- component - degrees of freedom - Gibb's phase rule - phase equilibrium - one component system – water system and sulphur system – two component system – solid liquid equilibrium. Simple eutectic diagram of Pb-Ag system- simple eutectic diagram- desilverisation of lead – compound formation with congruent melting point – (Mg-Zn) - incongruent melting point (Na-K) – NaCl –water system-freezing mixtures.

### Text Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Puri B. R. ,Sharma L. R. and Pathania M. S.	2013	Principles of Physical Chemistry	Shoban Lal Nagin Chand & Co., New Delhi
2	Glasstone S and Lewis D	2014	Elements of Physical Chemistry	Mac Millon Ltd, London
3	Banwell C.N	1994	Fundamentals of Molecular Spectroscopy	Mc GrawHill Education , Noida

### Reference Books

S.No	Author Name	Year of Publication	Title of the Book	Publisher Name
1.	Puri B.R., Sharma L.R., and Kalia K.K.	1993	Principles of Physical Chemistry (23 <sup>rd</sup> edition)	Shoban Lal Nagin Chand & Co. New Delhi.
2.	Maron and Prutton	1969	Physical Chemistry	Mac Millan, London
3.	Atkins P.W.	1994	Physical Chemistry (5 <sup>th</sup> edition)	Oxford University Press
4.	Gabor a Sobarjai and Yimin Li	2010	Introduction to Surface Chemistry and Catalysis (2 <sup>nd</sup> edition)	John Wiley & Sons, New Jersey

**Pedagogy**

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Quiz, Group discussion, Video/Animation.

**Course Designers**

**Dr. V. Sangu**, Assistant Professor, Department of Chemistry

**Dr. K. Shenbagam**, Assistant Professor, Department of Chemistry



**CORE PRACTICAL –V**  
**PHYSICAL CHEMISTRY (P)**

<b>Semester-V</b>	<b>PHYSICAL CHEMISTRY (P)</b>	<b>Hours/Week-3</b>	
<b>Core Practical V (CP)</b>		<b>Credit-3</b>	
<b>Course Code-19UCH5CC5P</b>		<b>Internal 40</b>	<b>External 60</b>

**Objectives**

- To learn the methods of finding CST, TT, Molecular weight and rate constant
- To understand the fundamentals of conductometric and potentiometric titrations.

**Course outcomes**

On successful completion of the course, the student will be able to

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO 1</b>	Construct the phase diagram	K3
<b>CO 2</b>	Relate the effect of impurity on phenol water System	K2
<b>CO 3</b>	Identify the molecular weight of unknown compound	K3
<b>CO 4</b>	Examine the concentration of ions using Potentiometer	K4
<b>CO 5</b>	Inspect the concentration of ions using Conductometer	K4

**Mapping with program outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>
<b>CO1</b>	S	S	S	S
<b>CO2</b>	S	S	M	S
<b>CO3</b>	S	S	M	S
<b>CO4</b>	S	S	S	S
<b>CO 5</b>	S	S	S	S

**S-Strong ; M- Medium**

**CORE PRACTICAL –V**  
**PHYSICAL CHEMISTRY (P)**

1. Determination of rate constant for acid catalyzed ester hydrolysis.
2. Critical Solution Temperature - Phenol-Water system
3. Effect of impurity (NaCl) on Critical Solution Temperature
4. Rast Method – Determination of molecular weight of unknown solute
5. Transition temperature of a salt hydrate – determination of molecular weight
6. Phase Diagram of simple eutectic system
7. Adsorption of acetic acid on activated charcoal, verification of Freundlich isotherm.
8. Conductometric Acid-Base Titration - (HCl vs NaOH).
9. Potentiometric Redox Titration – (FAS vs  $\text{KMnO}_4$ ).
10. Determination of equivalent conductance of a strong electrolyte (NaCl/KCl).

**MARK DISTRIBUTION :**

Internal : 40

Ext. Evaluation :60

Record :5

Procedure Writing with formula : 10

Practicals :45

**Text Books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Yadav J. B	2001	Organic Analytical Chemistry- Theory and Practice Chemistry (20 <sup>th</sup> edition)	GOEL Publishing House
2	Levitt B. P	1985	Findlay's Practical Physical Chemistry (9 <sup>th</sup> edition)	Longman
3	Gurtur J. N and Kapoor R	1997	Advanced Experimental Chemistry (Volume 1)	S. Chand and Co.,
4	Shoemaker and Gerland	2009	Advanced Physical Chemistry Experiments	McGraw – Hill Higher Education

**Reference Books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Gurtur J.R and Kapoor R	1997	Advanced Experimental Chemistry	S. Chand and Co. Ltd., New Delhi

**Pedagogy:** Hands on training

**Course Designer**

**Dr. K. Shenbagam**, Assistant Professor, Department of Chemistry.

<b>Semester V</b>	<b>NUCLEAR AND INDUSTRIAL CHEMISTRY</b>	<b>Hours/Week-5</b>	
<b>Major Based Elective-I</b>		<b>Credit-5</b>	
<b>Subject Code- 20UCH5MBE1A</b>		<b>Internal 25</b>	<b>External 75</b>

### Objective

- This course helps to learn the principles of nuclear and radiation chemistry.
- To understand the importance chemicals used in industries.

### Course Outcomes

On successful completion of the course, the student will be able to

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge level</b>
CO 1	Discuss about nuclear chemistry	K1
CO 2	Explore about Fundamentals of Radio chemistry	K2
CO 3	Explore about leather techniques	K2
CO 4	Discussing about various chemical process in industries	K3
CO 5	Explore about essential cosmetics and cleansing agents	K3

### Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	S	M	S	M
CO3	S	M	M	S	M
CO4	S	S	M	S	M
CO5	S	M	S	M	S

**S-Strong; M-Medium**

## **SEMESTER V**

### **NUCLEAR AND INDUSTRIAL CHEMISTRY**

#### **UNIT I Introduction to Nuclear Science**

**(15 Hrs)**

Introduction - composition of nucleus and nuclear forces (meson field theory) - nuclear stability - mass defect - binding energy - packing fraction - n/p ratio - magic numbers - nuclear models - liquid drop - shell and collective model – isotopes - detection (Thomson positive ray analysis, Dempster mass spectrograph)- separation (Thermal diffusion method, distillation method, gaseous diffusion method) - isobars, isotones and isomers.

#### **UNIT II: Nuclear Reactions and Reactor**

**(15 Hrs)**

Nuclear reaction - comparison with chemical reaction - Types - fission (atom bomb) and fusion (hydrogen bomb) - photonuclear reactions – stripping, spallation and pick-up reactions - Stellar energy – nuclear reactor – atomic power projects in India.

#### **UNIT III Radiation Chemistry**

**(15 Hrs)**

Radioactivity- Laws of radioactivity- the rate of disintegration –half-life and average life - group displacement law – radioactive decay process (alpha, beta, and gamma decay) - radioactive series – K capture – nuclear isomerism and isomeric transition– Detection and measurement of radioactivity (Geiger Muller counter, Cloud Chamber, ionization chamber) – radioisotopes applications- Hazards of radiation- radioactive waste disposal.

#### **UNIT IV Common Chemicals in Industries**

**(15 Hrs)**

Gaseous fuels– Types (producer gas, water gas, natural gas, coal gas)–composition- manufacture and applications- cement manufacture – wet and dry processes, composition and setting of cement. Primary constituents of paints- Dispersion medium - binder- Pigments- formulation of paints and varnishes- requirements of good paint.

#### **UNIT V Cosmetic Chemistry**

**(15 Hrs)**

Cosmetics– definition – types of cosmetics – composition of cosmetics – face powder, face creams sun screen lotion- nail polish- nail polish removers- deodorants-hair dye –shampoo- perfumes - their side effects-method of -preparation of soaps- synthetic detergents-alkyl aryl sulphonate and cleansing action of soaps.

### Text Books

S.No.	Author's Name	Year of Publication	Title of the Book	Publisher Name
1.	H. J. Arnikar	2005	Essentials of Nuclear Chemistry	New International Age Publishers, New Delhi,
2.	S.Glasstone, D.Van Nostrand,	1987	Source Book on Atomic Energy	East-West press, New Delhi,
3.	P.Singh, T.M.Joesph, R.G.Dhavale.	1983	Industrial Chemistry,	Himalaya Publishing House, Bombay, 4th Ed.,
4	A. Kent, Riegel	2009	Handbook of Industrial Chemistry,	CBS Publishers, New Delhi.
5.	B. K. Sharma	2013	Industrial Chemistry	Goel Publishing House

### Reference Books

S.No.	Author's Name	Year of Publication	Title of the Book	Publishers Name
1.	A.K. Srivatsava and P. Jain	1989	Essentials of Nuclear chemistry	S. Chand, New Delhi,
2.	M. Haissinsky, Addison	1964	Nuclear Chemistry and its applications	Wesley, New York.
3.	Bagavathi Sundari	2006	Applied Chemistry	MJP Publishers, Chennai
4.	P. C. Jain, M. Jain	2003	Engineering Chemistry	Dhanpat Rai & Sons, Delhi

### Chemistry Teaching Pedagogy:

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar

### Course Designer:

Dr. K. Uma Sivakami, Assistant Professor, Department of Chemistry.

<b>Semester V</b>	<b>BASICS OF NANOSCIENCE AND NANOTECHNOLOGY</b>	<b>Hours/Week-5</b>	
<b>Major Based Elective-I</b>		<b>Credit-5</b>	
<b>Subject Code- 20UCH5MBE1B</b>		<b>Internal 25</b>	<b>External 75</b>

### Course Objective

- To know the synthetic methods of nanomaterials.
- To understand the characterization of nanomaterials.
- To understand carbon based nanomaterials.

### Course Outcomes

<b>CO</b>	<b>CO Statement</b> <b>On the successful completion of the course, students will be able to</b>	<b>Knowledge Level</b>
CO1	Recall the basic concepts macro, micro and nanoscale materials	K1
CO2	Explain the synthesis of nanomaterials	K1
CO3	Analyze the characterization techniques of nanomaterials	K2
CO4	Understand the nano catalyst and carbon based nanomaterials.	K2
CO5	Illustrate the applications of nanomaterials.	K3

### Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	S	M	S	M
CO3	S	M	M	S	M
CO4	S	S	M	S	M
CO5	S	M	S	M	S

**S-Strong; M-Medium**

**SEMESTER V**  
**BASICS OF NANOSCIENCE AND NANOTECHNOLOGY**

**UNIT –I Fundamentals of Nanoscience** **(15 Hrs)**

Definition - nano – scale, materials, science - nano technology - scale of materials - natural and man-made - significance of nanoscale - optical, electrical, mechanical, and magnetic properties – nanomaterials - different types of nanomaterial and structures - quantum wells – quantum wires – quantum dots – nanoclusters – nanocrystals – nanowires and nanotubes (preliminary level).

**UNIT-II Synthesis of nanomaterials** **(15 Hrs)**

Physical methods - laser ablation- chemical vapour deposition (CVD) - solvated metal atom dispersion (SMAD) - Chemical methods - microwave irradiation -sol-gel process - precipitation technology - synthesis using microorganisms - precipitation method - thermal decomposition of complex precursors.

**UNIT –III Characterization techniques of nanomaterials** **(15 Hrs)**

Principle and Instrumentation techniques - X-ray diffraction technique, (XRD) - Ellipsometer, Confocal microscopy. Scanning Electron Microscopy (SEM) –Field Emission Scanning Electron Microscopy- Optical Absorption and Emission Spectroscopy.

**UNIT –IV Carbon based nanomaterials** **(15 Hrs)**

Structure and bonding in nano material – arm chair – zigzag – chiral patterns – theory of formation of different structures and growth process of CNT – single walled carbon nano tubes – multi walled carbon nano tubes – graphite – diamond – different types of carbon nano materials CNT, CNF, CNB - structure and properties.

**UNIT-V Applications of nanomaterials** **(15 Hrs)**

Molecular electronics – nano electronics – quantum electronic devices – CNT based transistor – field emission display – biological applications – cancer therapy - biosensor – membrane-based water purification – nano painting – nano coating – nano materials for renewable energy – nano carbon in lithium batteries.



**TextBook**

S.No	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	C. N. R. Rao, A. Muller and A. K. Cheetham	The Chemistry of Nanomaterials: (Eds),	Wiley-VCH; Germany, Vol. 1 and 2	2004
2.	T. Pradeep	The Essentials in Understanding Nanoscience and Nanotechnology 1st Ed.,	Tata McGraw Hill, New York, 1st Ed.,	2007
3.	S. Thomas, N. Kalarikkal, A. Manuel Stephan, B. Raneesh	Advanced Nanomaterials thesis, Properties, and Applications	Apple Academic Press	2021.
4.	N. John Dinardo	Nanoscale Charecterisation of surfaces and Interfaces	Weinheim Cambridge, Wiley.	2000
7.	A. Lakhtakia	The Hand Book of Nano Technology, Nanometer Structure, Theory, Modeling and Simulations	Prentice-Hall of India (P) Ltd, New Delhi	2007

**ReferenceBooks**

S. No	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	G. Timp	Nanotube Super fiber Materials: Science, Manufacturing, Commercialization (Micro and Nano Technologies)	2nd Edition, Kindle	2020
2.	T. Awan, A. Bashir, A. Tehseen	The Chemistry of Nanomaterials fundamentals and Applications	Elsevier, e-book	2020

**Pedagogy**

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar

**Course Designers**

1. Dr. G. Sivasankari, Assistant Professor, Department of Chemistry
2. Ms. P. Thamizhini, Assistant Professor, Department of Chemistry
3. Dr. K. Uma Sivakami, Assistant Professor, Department of Chemistry

**SKILL BASED ELECTIVE -II**  
**CHEMISTRY OF CONSUMER PRODUCTS (P)**

<b>Semester-V</b>	<b>CHEMISTRY OF CONSUMER PRODUCTS(P)</b>	<b>Hours/Week-2</b>	
<b>Skill Based Elective-II</b>		<b>Credit-2</b>	
<b>Course Code-19UCH5SBE2AP</b>		<b>Internal 40</b>	<b>External 60</b>

**Objectives**

This skill based course provides

- Students the basic knowledge in Chemistry of consumer products and modern trends in the industry.
- To provide the practical training to the students in consumer product analysis

**Course outcomes**

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

<b>CO</b>	<b>CO Statements</b>	<b>Knowledge Level</b>
<b>CO1</b>	Know about Chemistry and modern trends in the industry.	K1
<b>CO2</b>	Identify the cations and anions present in the mixture	K1
<b>CO3</b>	Demonstrate the experimental methods of group separation	K2

**Mapping with Programme Outcomes**

CO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	M	S
CO3	S	S	S	S	M

S-Strong ; M- Medium

## **SEMESTER-V**

### **CHEMISTRY OF CONSUMER PRODUCTS(P)**

01. Detection of adulterants in milk and milk products.

02. Detection of adulterants in oil

03, Detection of adulterants in spices and cardiments

04. Detection of adulterants in food products.

05. Estimation of food colors. (Colorimetric analysis)

06. Industrial visit – Report

#### **Text Books**

<b>S. No.</b>	<b>Author's Name</b>	<b>Year of Publication</b>	<b>Title of the Book</b>	<b>Publishers</b>
1.	Sally A. Henrie,	2015	Green Chemistry Laboratory Manual for General Chemistry	Press Taylor & Francis Group, and Informa Business.

#### **Course Designers**

❖ **Dr. G. Sivasankari**, Assistant Professor, Department of Chemistry.

❖ **Dr. R. Subha**, Assistant Professor, Department of Chemistry

**SKILL BASED ELECETIVE -II**  
**DYE CHEMISTRY(P)**

<b>Semester-V</b>	<b>DYE CHEMISTRY(P)</b>	<b>Hours/Week-2</b>	
<b>Skill Based Elective -II</b>		<b>Credit-2</b>	
<b>Course Code- 19UCH5SBE2BP</b>		<b>Internal 40</b>	<b>External 60</b>

**Objectives**

This skill based course provides

- To enhance the basic knowledge in application of dyes in industries and water treatment.
- To provide the practical training to the students in preparation of dyes for fabrication.

**Course outcomes**

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

<b>CO</b>	<b>CO Statements</b>	<b>Knowledge Level</b>
<b>CO1</b>	Identify the usages of dyes in industries	K1
<b>CO2</b>	Quantify the presence of dyes in the samples	K1
<b>CO3</b>	Demonstrate the experimental methods of preparation of dyes.	K2

**Mapping with Programme Outcomes**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	S	S	M	S	S
CO2	S	M	S	M	S
CO3	S	S	S	S	M

S-Strong ; M- Medium

**SEMESTER-V**  
**DYE CHEMISTRY(P)**

A. Preparation of Dyes

- i) Azo dye preparation by coupling reaction
- ii) Indigo dye preparation

B. Separation of given mixture by chromatographic method.

C. Quantitative analysis

- i) Determination of microbial count in milk using dyes.
- ii) Determination of photocatalytic activity of biomass using cationic dye.
- iii) Determination of concentration of dyes in given sample using spectrophotometer.

**Textbooks**

S. No.	Author's Name	Year of Publication	Title of the Book	Publishers
1.	James Park and John Shore	1993	Practical Dyeing (Volume 1-3)	Textile Apparel and Fashion
2.	B.K. Sharma	2006	Analytical chemistry	Krishnan Praksham Median Meerut.

**Course Designers**

❖ **Dr. R. Subha**, Assistant Professor, Department of Chemistry

❖ **Dr. K. Uma Sivagami**, Assistant Professor, Department of Chemistry

**SKILL BASED ELECETIVE -III  
WATER ANALYSIS (P)**

<b>Semester-V</b>	<b>WATER ANALYSIS (P)</b>	<b>Hours/Week-2</b>	
<b>Skill Based Elective -III</b>		<b>Credit-2</b>	
<b>Course Code-20UCH5SBE3AP</b>		<b>Internal 40</b>	<b>External 60</b>

**Objectives**

This skill based course provides

- Knowledge on the design of wastewater treatment.
- Maintain the outflow level of impurities from water and wastewater treatment plant
- Manage sewage disposal

**Course outcomes**

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

<b>CO</b>	<b>CO Statements</b>	<b>Knowledge Level</b>
<b>CO1</b>	Design the treatment unit for water treatment	K1
<b>CO2</b>	Identify the outflow level of impurities from water	K1

**Mapping with Programme Outcomes**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	S	S	M	S	S
CO2	S	M	S	M	S

S-Strong ; M- Medium

**SEMESTER-V**  
**WATER ANALYSIS (P)**

1. Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA Method
3. Determination of dissolved oxygen content of water sample by Winkler's method.
4. Determination of chemical oxygen demand ( COD) of wastewater
5. Determination of chloride content of water sample by Argentometric method
6. Determination of oil and grease from wastewater.

**Text Books**

<b>S. No.</b>	<b>Author's Name</b>	<b>Year of Publication</b>	<b>Title of the Book</b>	<b>Publishers</b>
1.	P. C. Jaiswal	2014	Soil, Plant and Water Analysis	Kalyani Publishers
2.	Dr. R. K. Trivedy and P. K. Goel.	1984	Chemical and Biological Analysis of Water	Environmental publications

**Course Designers**

- ❖ **Dr. G. Sivasankari**, Assistant Professor, Department of Chemistry.
- ❖ **Dr. K. Shenbagam**, Assistant Professor, Department of Chemistry

**SKILL BASED ELECETIVE -III****BIOFUELS (P)**

<b>Semester-V</b>	<b>BIOFUELS (P)</b>	<b>Hours/Week-2</b>	
<b>Skill Based Elective -III</b>		<b>Credit-2</b>	
<b>Course Code-19UCH5SBE3BP</b>		<b>Internal 40</b>	<b>External 60</b>

**Objectives**

This skill based course provides knowledge on

- Techniques to extract the oil from plant material.
- Identifying the different fuel viscosity.
- Calculating the yield of sugar

**Course outcomes**

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

<b>CO</b>	<b>CO Statements</b>	<b>Knowledge Level</b>
<b>CO1</b>	Know about the techniques to extract oil from plant	K1
<b>CO2</b>	Evaluate fuel viscosity	K1
<b>CO3</b>	Calculate the yield of sugar and types	K2

**Mapping with Programme Outcomes**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	M	S	M	S	S
CO2	S	M	S	M	S
CO3	M	S	M	S	M

S-Strong ; M- Medium



**SEMESTER-V**  
**BIOFUELS (P)**

**Any five from the following experiments**

1. Extraction of oil from plant sources.
2. Determination of fuel viscosity.
3. Conversion of vegetable oil to biodiesel
4. Extraction of sugar from sugar beet
5. Identification of starch and determination of glucose concentration
6. Determination of non- reducing sugars.

**Text Books**

S. No.	Author's Name	Year of Publication	Title of the Book	Publishers
1.	P. C. Jaiswal		Practical biofuel activities for school engagement and outreach	<a href="http://www.bbsrc.ac.uk">www.bbsrc.ac.uk</a>
2.	Gerhard Knothe, Jürgen Krahl, Jon Van Gerpen	2015	The Biodiesel Handbook, 2 <sup>nd</sup> Edition	Elsevier Science

**Reference Books**

S. No.	Author's Name	Year of Publication	Title of the Book	Publishers
1.	R. D. Tyagi, Song Yan, Tian C. Zhang, Xiaolei Zhang	2019	Biodiesel Production Technologies, Challenges, and Future Prospects 2019	<a href="http://www.asce.org">American Society of Civil Engineers</a>

**Course Designers**

- ❖ **Dr. K. Shenbagam**, Assistant Professor, Department of Chemistry
- ❖ **Dr. G. Sivasankari**, Assistant Professor, Department of Chemistry

**SEMESTER-VI  
ORGANIC CHEMISTRY-II**

<b>Semester-VI</b>	<b>ORGANIC CHEMISTRY-II</b>	<b>Hours/Week-6</b>	
<b>Core Course-VIII</b>		<b>Credit-5</b>	
<b>Course Code- 19UCH6CC8</b>		<b>Internal 25</b>	<b>External 75</b>

**Objectives**

- This course helps to learn the Chemistry of carbohydrates, proteins, vitamins, alkaloids and terpenoids.
- To recognize the rearrangement mechanism and spectroscopy techniques for the elucidation of structures.

**Course Outcomes**

On successful completion of this course, the student will be able to

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	Recall the basic concepts of carbohydrates, proteins and vitamins.	K1
<b>CO2</b>	Demonstrate the preparation and properties of amino acids, alkaloids and terpenoids	K2
<b>CO3</b>	Illustrate the structure of proteins and vitamins.	K3
<b>CO4</b>	Analyze the nucleophilic and electrophilic rearrangements.	K4
<b>CO5</b>	Deduce the structure of organic molecules using spectroscopic techniques.	K4

**Mapping with Programme Outcomes**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO4</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>M</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>

S- Strong; M-Medium

**SEMESTER-VI**  
**ORGANIC CHEMISTRY - II**

**UNIT I Chemistry of Carbohydrates**

**(18 Hrs)**

Carbohydrate: Classification - properties of monosaccharides (glucose and fructose) - structure and configuration of monosaccharides- interconversion. Ascending and descending series-muta rotation, and epimerization- cyclic structure - determination of size of sugar rings. Disaccharides: Sucrose, maltose - structure elucidation. Polysaccharide: Starch and cellulose (elementary treatment).

**UNIT II Chemistry of Proteins and Vitamins**

**(18 Hrs)**

Amino acids: Zwitter ion – isoelectric point - general methods of preparation and reactions of amino acids. Peptides: Peptide linkages. Proteins: Classification of proteins -structure of proteins - primary structure - end group analysis - Edman method - secondary structure - tertiary structure - denaturation - colour reactions of proteins. Nucleic acids: Elementary treatment of DNA and RNA. Vitamins: Classification, structure and biological importance of vitamins A, B1, B2, B6, B12 and C.

**UNIT III Chemistry of Alkaloids and Terpenoids**

**(18 Hrs)**

Chemistry of natural products: Alkaloids: Classification, isolation - methods for synthesis of coniine, piperine, nicotine and quinine. Terpenoids: Classification - isoprene, special isoprene rule, methods for synthesis of citral, limonene, menthol and camphor.

**UNIT IV Molecular Rearrangements**

**(18 Hrs)**

Molecular Rearrangements: Types of rearrangement (nucleophilic and electrophilic) – mechanism with evidence for the following re-arrangements - Pinacol – Pinacolone. Benzil - Benzilic acid, Benzidine, Claisen, Fries, Hofmann, Curtius, Lossen, Beckmann and Dienone – phenol rearrangements.

**UNIT V Organic Spectroscopy**

**(18 Hrs)**

UV - VIS spectroscopy: Types of electronic transitions – bathochromic shift, hypochromic shift, hyperchromic shift and hypochromic shift. Instrumentation- solvent effects on  $\lambda_{\max}$  - Woodward - Fieser rules for calculation of  $\lambda_{\max}$  : Dienes only. IR spectroscopy: Number and types of fundamental vibrations – selection rules- modes of vibrations - instrumentation - position of IR absorption frequencies for functional groups like aldehyde, ketone, alcohol, acid, amine and amide. NMR spectroscopy: Principle - chemical shift- factors affecting the chemical shift - inductive effect and hydrogen bonding - TMS, delta scales, splitting of signals - spin-spin coupling, NMR spectrum of EtOH, n -propyl bromide and isopropyl bromide.

## Textbooks

S. No.	Author's Name	Year of Publication	Title of the Book	Publisher's Name
1.	Finar I.L.,	1996	Organic Chemistry, Vol 1&2	6th edition, Addison Wesley Longman, England.
2.	Bahl B.S. and Bahl A.,	2010	Advanced Organic Chemistry	12th edition, Sultan Chand & Co., New Delhi.
3.	Morrison R.T, Boyd R.N, and Bhattacharjee S. K	2011	Organic Chemistry	7th edition, Pearson, India.
4.	Y.R. Sharma	2007	Elementary Organic Spectroscopy.	Revised edition, S. Chand Publishing, New Delhi.
5.	Silverstein, R. M, Webster, F. M	2015	Spectroscopy identification of Organic compounds,	7th edition, CRC Press,

## Reference Books

S. No.	Author's Name	Year of Publication	Title of the Book	Publisher's Name
1.	Pine S.H.,	1987	Organic Chemistry	(5th edition), McGraw – Hill International Book Company, New Delhi.
2.	Seyhan N. Ege,	2005	Organic Chemistry	5th edition, Houghton Mifflin Co., New York.
3.	William Kemp	1991	Organic Spectroscopy	3rd edition, ELBS
4.	Pavia, D. L. Lampman, G. M, Kriz, G. S, Vyvyan, J. A	2015	Introduction to Spectroscopy	5th edition, Cengage Learning,

## Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Quiz, Group Discussion, Mini project, Video / Animation

## Course Designers

- ❖ **Ms. A. Sharmila**, Assistant Professor, Department of Chemistry
- ❖ **Dr.C.Rajarajeswari**, Assistant Professor, Department of Chemistry

**CORE COURSE -IX (CC)**  
**PHYSICAL CHEMISTRY-II**

Semester -VI	PHYSICAL CHEMISTRY -II	Hours/Week-6	
Core Course -IX(CC)		Credit:5	
Course Code – 19UCH6CC9		Internal	External
		25	75

**Objectives**

- After studying this course students can understand electrochemistry, electrolytes, spectroscopy, molecular symmetry, and group theory.

**Course Outcomes**

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

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO1	Apply various theories of weak and strong electrolyte to predict solubility and ionic products.	<b>K2</b>
CO2	Predict reduction potential of a metal and EMF the cell.	<b>K3</b>
CO3	Evaluate internuclear distance and bond strength using IR and rotational spectral data.	<b>K3</b>
CO4	Relate NMR and ESR concept to analyze structure of the molecules.	<b>K2</b>
CO5	Analyze symmetry of the molecule.	<b>K2</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	S	S	S	S	S
<b>CO2</b>	S	S	S	S	S
<b>CO3</b>	M	M	S	S	S
<b>CO4</b>	S	S	S	S	S
<b>CO5</b>	S	M	M	S	S

**S -Strong , M-Medium , L -Low**

**CORE COURSE -IX (CC)**  
**PHYSICAL CHEMISTRY -II**

**UNIT-I Electrochemistry –I**

**(18 Hrs)**

Electrolytic conductance – specific, equivalent and molar conductance – Relations between them – measurement of conductance and cell constant. Variation of conductance with dilution – Strong and weak electrolytes. Migration of ions – transport number – determination (Hittorf and moving boundary methods) – Kohlrausch's law – applications – Calculation of equivalent conductance for weak electrolytes and determination of transport number. Ionic mobilities and Ionic conductance. Ostwald's dilution law - Degree of dissociation of weak electrolytes – Determination of Ionic product of water – Determination of solubility of sparingly soluble salts – conductometric titrations- Theory of strong electrolytes – Debye – Huckel – Onsager theory-verification of Onsager equation – Wein and Debye –Falkenhagen effect.

**UNIT- II Electrochemistry –II**

**(18 Hrs)**

Galvanic cells – Reversible and Irreversible cells – EMF and its measurement – Weston Standard cell – types of reversible single electrodes – standard Hydrogen electrode – Calomel electrode – Derivation of Nernst equation both for emf of cells and single electrode potentials – Nernst theory for single electrode potential –standard reduction potentials – electro chemical series – significance. Application of emf measurements – Application of Gibbs –Helmholtz equation to galvanic cells – calculation of thermodynamic quantities – pH using hydrogen, quinhydrone and glass electrodes – potentiometric titrations.

**UNIT-III Spectroscopy- I**

**(18 Hrs)**

Introduction - various types of molecular spectra - electronic, vibrational, and rotational energy levels - Born-Oppenheimer approximation. Rotational spectroscopy: Rotation spectra of diatomic molecules - determination of bond length and moment of inertia from rotational spectra - numerical problems - selection rule, effect of isotopic substitution. IR spectroscopy: theory - stretching and bending vibrations - factors affecting vibrational frequencies - important spectral regions for the characterization of functional groups - finger print region- qualitative relation of force constant to

bond energies - selection rules. Raman spectroscopy: Principle - Rayleigh and Raman scattering - Stokes and Anti-stokes lines - differences between IR and Raman spectroscopy - mutual exclusion principle – selection rule – applications- - vibrational modes of H<sub>2</sub>O and CO<sub>2</sub> – applications.

#### **UNIT – IV Spectroscopy- II**

**(18 Hrs)**

Raman spectroscopy: Principle - Rayleigh and Raman scattering - Stokes and Anti-stokes lines - differences between IR and Raman spectroscopy - mutual exclusion principle. NMR spectroscopy: Theory of NMR, modes of nuclear spin-relaxation process - shielding effect, hyperfine splitting, coupling constants, - chemical shift - factors affecting chemical shift - applications of NMR and limitations of NMR. ESR spectroscopy: principle - energy level splitting - presentation of ESR spectrum for methyl and benzene radicals, deuterium – applications.

#### **UNIT-V Quantum Chemistry & Group Theory**

**(18 Hrs)**

Quantum postulates- wavefunction and its significances- quantum mechanical operator-name and formula alone-Schrodinger wave equation derivation. Concept of symmetry in Chemistry - symmetry operations and symmetry elements - rotational axis of symmetry and types of rotational axes - planes of symmetry and types of planes - improper rotational axis of symmetry - identity element - groups and their basic properties – Abelian and cyclic groups - classification of molecules into point groups - the symmetry operations of a molecule form a group – H<sub>2</sub>O, BF<sub>3</sub> and NH<sub>3</sub> point groups.

#### **Textbooks:**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Puri B. R. ,Sharma L. R. and Pathania M. S.	2019	Principles of Physical Chemistry	Shoban Lal Nagin Chand & Co., New Delhi
2	Gurdeep Raj	2014	Advanced Physical Chemistry	Goel Publishing House
3.	Banwell C.N	1994	Fundamentals of Molecular Spectroscopy	Mc Graw Hill Education, Noida
4.	Sharma B. K	2006	Spectroscopy	Goel Publishing house, Meerut

5.	Gopinathan M.S &. Ramakrishnan V	2013	Group theory in Chemistry	Vishal publishing & Co -Punjab
6.	Soni P.L, Dharmarha O.P. & Dash U.N.	2016	Text book of Physical Chemist	Sultan Chand & Sons, New Delhi

### Reference Books

S.No	Author Name	Year of Publication	Title of the Book	Publisher Name
1.	Puri B.R., Sharma L.R., and Kalia K.K.	1993	Principles of Physical Chemistry (23rd edition)	Shoban Lal Nagin Chand & Co.New Delhi.
2.	Bhattacharya P.K.	2014	Group theory and its Chemical Applications	Himalaya publishing House.
3.	Glasstone. S	2004	An Introduction to Electrochemistry	Affiliated East West press, New Delhi
4.	Drago R.S.	2010	Physical Methods in Inorganic Chemistry	John Wiley & Sons, New Jersey
5.	Atkins P.W.	1994	Physical Chemistry (5th edition)	Oxford University Press

### Pedagogy

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Quiz, Group discussion, Video/Animation.

### Course Designers

**Dr. V.Sangu**, Assistant Professor, Department of Chemistry

**Mrs.S. Jeevitha**, Assistant Professor, Department of Chemistry



<b>Semester VI</b>	<b>GRAVIMETRIC ANALYSIS AND PHYSICAL PARAMETER (P)</b>	<b>Hours/Week-4</b>	
<b>Core Practical VI (CP)</b>		<b>Credit-4</b>	
<b>Subject Code- 20UCH6CC6P</b>		<b>Internal 40</b>	<b>External 60</b>

### Course Objectives

This core practical provides.

- To perform the gravimetric analysis and estimating the given compound.
- To provide the practical training to the students in chromatographic techniques

### Course outcomes

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

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO 1	Know about the accuracy in Gravimetric estimations and its significance	K1
CO 2	Identify the compounds using thin layer Chromatography	K2
CO 3	Demonstrate the experimental method of Paper chromatography in the separation of amino acids and dyes	K2
CO 4	Analyze the physical constants of the organic compounds	K3

### Mapping with Programme Outcomes

<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	M	S	S	S	M
CO2	S	S	M	S	S
CO3	S	M	S	S	S
CO4	M	S	M	S	M

S-Strong ; M- Medium, L -Low

**CORE PRACTICAL VI (CP)**  
**GRAVIMETRIC ANALYSIS AND PHYSICAL PARAMETER (P)**

**I GRAVIMETRIC ANALYSIS**

1. Estimation of Lead as Lead chromate.
2. Estimation of Barium as Barium Chromate.
3. Estimation of Nickel as Nickel – DMG complex.
4. Estimation Calcium as Calcium oxalate monohydrate
5. Estimation of Aluminium as Aluminium oxyquinolate.
6. Estimation of iron as iron (II) oxide

**II PHYSICAL PARAMETERS**

Determination of melting point and boiling point of organic compounds.

**Text books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu	1997	Basic Principles of Practical Chemistry	Sultan Chand & Sons, New Delhi.
2	N. S Gnanaprakasam and G Ramamoorthi	2007	Organic Chemistry Lab Manual	SV printers
3	Mohan. J	2003	Organic Analytical Chemistry- Theory and Practice	Narosa

**Reference books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Raj K Bansal	2001	Laboratory Manual of Organic Chemistry	New Age International Publishers
2	A. I. Vogel, T.R Tatchell, B. S. Furniss, A.J. Hannaford and P.W.G.Smith	1989	Vogel's Textbook of Practical Organic Chemistry	Pearson India

**Course Designers**

- ❖ Dr. Pungayee Alias Amirtham
- ❖ Dr. R. Subha

<b>Semester-VI</b>	<b>ANALYTICAL CHEMISTRY TECHNIQUES (P)</b>	<b>Hours/Week-3</b>	
<b>Major Based Elective-II</b>		<b>Credit-3</b>	
<b>Subject Code- 20UCH6MBE2AP</b>		<b>Internal 40</b>	<b>External 60</b>

#### Course Outcome

- To acquire knowledge about performing analytical experiments.
- To gain more insights on analytical methods such as chromatography, titrations and pH measurements.

#### Course outcomes

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

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO1	Identify and separate the given compounds using various analytical methods.	K1&K2
CO2	Apply the theoretical concepts to perform experiments	K3
CO3	Analyse the quality and quantity of the given compounds using methods such as chromatography, titrations and pH measurements.	K4

#### Mapping with Programme Outcomes

<b>Cos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	S	S

S-Strong ; M- Medium, L -Low

**MAJOR BASED ELECTIVE-II  
ANALYTICAL CHEMISTRY TECHNIQUES (P)**

1. Paper Chromatography –Separation of mixture:
  - a) Sugars
  - b) Amino Acids
  - c) Dyes
  - d) Metal ions
  - e) Indicators
2. Thin Layer Chromatography – Separation of mixture:
  - a) Nitro compounds.
  - b) Metal ions
3. Separation of plant pigments using paper chromatography:
  - a) Chlorophyll A
  - b) Chlorophyll B
  - c) Xanthophylls
  - d) Carotenoids
4. Analysis of Milk of Magnesia.
5. Analysis of soil
  - a) Determination of pH of soil.
  - b) Determination of total soluble salts.
  - c) Determination of carbonate and bicarbonate.
  - d) Determination of calcium, magnesium and iron.
6. Determination of calcium ion concentration in egg shell/milk/limestone samples.
7. Determination of caffeine in tea samples.

**Text Books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	F. W. Fifield and D. Kealey	2000	Principles and Practice of Analytical Chemistry	Blackwell Science Ltd
2	R. V. Dilts	2010	Analytical Chemistry: Methods of Separation	Van Nostrand, New York
3	Daniel, C. Harris	2015	Quantitative Chemical Analysis	WH Freeman

### Reference Books

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	J. Mendham	2009	Vogel's Quantitative Chemical Analysis	Pearson Education
2	Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug.	2013	Analytical Chemistry	Wiley

### Course Designer

❖ Dr. S. Saranya

<b>Semester VI</b>	<b>ANALYSIS OF HERBAL MEDICINE (P)</b>	<b>Hours/Week-3</b>	
<b>Major Based Elective-II</b>		<b>Credit-3</b>	
<b>Subject Code- 20UCH6MBE2BP</b>		<b>Internal 40</b>	<b>External 60</b>

### Course Objective

- To know estimate the phytochemical in medicinal herbs.
- To learn methods to prepare lotion, cream, churna and table.

### Course Outcome

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

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
CO1	Understand the principle and testing methods of Excipients of natural origins.	K1, K2
CO2	Isolate, identify and estimate alkaloids, phenol content, aldehydes present in medicinal plant	K3, K4
CO3	Prepare and analyses herbal churna, tablet, lotion and shampoo.	K4, K5

### Mapping of Course Outcomes

<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
CO1	S	L	L	L	S
CO2	M	S	L	L	M
CO3	S	M	M	M	S

**S-Strong; M-Medium, L -Low**

## MAJOR BASED ELECTIVE-II ANALYSIS OF HERBAL MEDICINE(P)

**Physical and chemical test for evaluation of herbal medicines:**

**A. Quantitative estimation**

- a) Determination of total alkaloids in cinchona extract.
- b) Determination of proximate value of edible oil.
- c) Determination of aldehyde content in lemon oil.
- d) Estimation of total phenol content powdered herbal drug.
- e) Refractive index value of castor oil.

**B. Qualitative preliminary test for phytochemicals:**

Flavonoids, phenolic compounds, alkaloids, glycosides, carbohydrates, carotenoids, proteins, tannin, aminoacids, sterols Screening of Aqueous Extract of Neem.

**C. Preparation of drugs:**

- a) Preparation Turmeric Cream.
- b) Preparation Herbal Lotion.
- c) Preparation and Standardization of Methi-Shikakai Shampoo.
- d) Preparation of Orange Syrup B.P.C.

**Text Books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	Willow J. H. Liu	2021	Traditional Herbal Medicine Research Methods: Identification, Analysis, Bioassay, and Pharmaceutical and Clinical Studies	Jon Wiley publication

**Reference Books**

S.No.	Author Name	Year of Publication	Title of the Book	Publisher Name
1	K. K. Rajasekhar, B. Kishore, J. Bhavitha	2021	Text book of herbal and cosmetic analysis	Independent online publication

**Course Designer**

**Dr. V. Sangu,** Assistant Professor, Depart



**MAJOR BASED ELECTIVE-III  
POLYMER CHEMISTRY**

<b>Semester-VI</b>	<b>POLYMER CHEMISTRY</b>	<b>Hours/Week-5</b>	
<b>Major Based Elective Course-III</b>		<b>Credit-5</b>	
<b>Course Code- 19UCH6MBE3A</b>		<b>Internal 25</b>	<b>External 75</b>

**Objectives**

- To know the chemistry of polymers.
- To study the concepts of polymerization and techniques
- To study the importance of polymers.

**Course Outcomes**

On successful completion of this course, the student will be able to

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	Classify polymers and explain the configuration of polymers and properties like glass transition temperature and melting point of polymers	K2
<b>CO2</b>	Illustrate the preparation, properties and applications of polymers	K2
<b>CO3</b>	Outline the recent advances in polymer chemistry.	K3
<b>CO4</b>	Acquaint various polymer processing technologies and moulding techniques.	K4
<b>CO5</b>	Interpret the mechanism of polymerization	K5

**Mapping with Programme Outcomes**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO4</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>M</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>

S- Strong; M-Medium, L -Low

## **MAJOR BASED ELECTIVE-III**

### **POLYMER CHEMISTRY**

#### **UNIT 1 Introduction to Polymers**

**(15 Hrs)**

Definition of monomer, polymer and polymerization – .classification of polymers on the basis of sources and applications - thermosetting and thermoplastics. Functionality and degree of polymerization. Types of polymerization reactions: Chain polymerization - free radical and ionic polymerization - step polymerization reactions- polyaddition – polycondensation - ring opening - group transfer polymerization - copolymerization. Tacticity in polymers: Isotactic, syndiotactic and atactic polymers.

#### **UNIT II Properties and Reactions of Polymers**

**(15 Hrs)**

Properties: Glass transition temperature ( $T_g$ ) -definition – factors affecting  $T_g$ . Relationship between  $T_g$  and molecular weight. Importance of  $T_g$ . Molecular weight of polymers: number average ( $M_n$ ) - weight average ( $M_w$ ) - sedimentation and viscosity average molecular weights. Reactions: Hydrolysis – hydrogenation – addition – substitutions – cross linking and cyclisations reaction. Polymer degradation- thermal, photo and oxidation degradation of polymers (basics only)

#### **UNIT III Polymerization Techniques and Moulding Technique**

**(15 Hrs)**

Polymerization techniques: Bulk, solution, emulsion, melt condensation and interfacial polycondensation polymerization. Moulding techniques: Injection, compression, extrusion, rotational and calendaring.

#### **UNIT IV Chemistry of Commercial Polymers**

**(15 Hrs)**

Preparation, properties and uses of the polymers: Polyethylene, polypropylene, polystyrene, PVC, teflon and polymethylmethacrylate, polycarbonate, polyurethanes, polyamides (Kevlar), phenol-formaldehyde, urea-formaldehyde resin, epoxy resins, rubber-styrene and neoprene rubbers.

#### **UNIT V Advances in Polymers**

**(15 Hrs)**

Biopolymers: Biodegradable polymers - polymers in medical field - high temperature and fire-resistant polymers. Conducting polymers: Polyacetylene, poly (p-phenylene vinylene) and polypyrrole.

Adhesive and coatings, liquid crystalline polymers. Rubbers: Types of rubbers –vulcanization of rubbers. Environmental Hazards of plastics and recycling.

### Text Books

S. No.	Author's Name	Year of Publication	Title of the Book	Publisher's Name
1.	Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar	1978	Polymer Science	Wiley Eastern Ltd., New Delhi
2.	Sharma, B.K	1989	Polymer Chemistry	Goel Publishing House, Meerut.
3.	Premamoy Ghosh	2011	Polymer Science and Technology	3 <sup>rd</sup> edition, Tata McGraw Hill Education Private Limited, New Delhi.
4.	George Odian	2004	Principles of Polymerization	4 <sup>th</sup> edition, John Wiley and Sons, New York.

### Reference Books

S. No.	Author's Name	Year of Publication	Title of the Book	Publisher's Name
1.	Arora M.G., Singh M. and Yadav M.S.,	1989	Polymer Chemistry	2nd Revised edition, Anmol Publications Private Ltd., New Delhi,
2.	Billmeyer F.W	1984.	Text Book of Polymer Science	John Wiley and Sons, New York.
3.	Joel R. Fried	2014	Polymer Science and Technology	3 <sup>rd</sup> Edition, Pearson.

### Pedagogy

E-content, Lecture, Power point presentation, Seminar, Assignment, Quiz, Group Discussion, Mini project, Video / Animation

### Course Designers

- ❖ **Ms. A. Sharmila**, Assistant Professor, Department of Chemistry
- ❖ **Ms. P.Thamizhini**, Assistant Professor, Department of Chemistry

**MAJOR BASED ELECTIVE -III  
PHARMACEUTICAL CHEMISTRY**

<b>Semester –VI</b>	<b>PHARMACEUTICAL CHEMISTRY</b>	<b>Hours/Week-5</b>	
<b>Major based Elective-III</b>		<b>Credit:5</b>	
<b>Course Code -</b> <b>19UCH6MBE3B</b>		<b>Internal</b>	<b>External</b>
		<b>25</b>	<b>75</b>

**Objectives**

1. To study the classification of drugs.
2. To know the importance and functioning of antibiotics.
3. To learn common diseases and their treatment.

**Course Outcomes**

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

<b>CO</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	Explain the terminologies used in pharmacology	K2
<b>CO2</b>	Classify and compare different types of drug	K4
<b>CO3</b>	Describe the functions and mode of actions of drugs	K3
<b>CO4</b>	Explain the cause and symptom of common diseases	K2
<b>CO5</b>	Demonstrate the functions of medicine for common diseases	K2

**Mapping with Programme Outcomes**

<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	S	S	S	S	S
<b>CO2</b>	S	S	S	S	S
<b>CO3</b>	M	M	S	S	S
<b>CO4</b>	S	S	S	S	S
<b>CO5</b>	S	M	M	S	S

**S -Strong , M-Medium , L -Low**

## **MAJOR BASED ELECTIVE -III PHARMACEUTICAL CHEMISTRY**

### **UNIT - I Important Terminologies of drugs**

**(15 Hrs)**

Drugs – medication - definition of pharmacy, pharmacology pharmacophore, pharmacognosy, pharmacodynamics, pharmacopoeia, therapeutics - toxicology, chemotherapy – classification of drugs - LD50, ED50 and therapeutic index - drug administration routes – local, enema, external and parental.

### **UNIT - II Antibiotics**

**(15 Hrs)**

Antibiotics- -classification - broad and narrow spectrum, Antibiotics – Therapeutical values of penicillin, tetracyclines, chloramphenicol and streptomycin. penicillin, ampicillin, structure and mode of action only. Sulphonamides-mechanism and action of sulpha drugs preparation and uses of sulphadiazine, sulphapyridine.

### **UNIT -III Analgesics, Antipyretics and Anesthetics drugs**

**(15 Hrs)**

Analgesics- -classification -narcotic analgesics- analgesic action, uses and structure activity of morphine, codeine. Non-narcotic analgesics –aspirin and paracetamol. Antipyretic analgesics- salicylic acid derivatives-methyl salicylate. Anesthetics- local anesthetics –procaine- General anesthetics- chloroform and halothane.

### **UNIT - IV Blood and Cardiovascular drugs**

**(15 Hrs)**

Composition of blood – blood grouping and matching – Rh factor – Buffers in blood –plasma protein function –clotting mechanism - Blood pressure – causes, control and treatment- antihypertension drugs- cardiovascular drugs – antiarrhythmic drugs cardiac glycosides, vasodilators (two example for each) – anticoagulants - antianginal agents – lipid lowering agents- sclerosing agents.

### **UNIT – V Common Diseases and Health Care**

**(15 Hrs)**

Common diseases – causes and treatment of insect borne diseases (Malaria and Filariasis), airborne diseases (Diphtheria, Whooping cough, Influenza, common cold, TB) and water borne diseases (Cholera, Typhoid and Dysentery). Digestive disorder – Jaundice -Skin diseases- Respiratory disorder –Asthma. Nervous system disorder – epilepsy -leprosy. Health care - First aid to prevent bleeding and maintain breathing- causes and symptoms of food poisoning,

botulism-mushroom poisoning-first aid -ulcer treatment.

### Text Books

S.No.	Authors Name	Year of Publication	Title of the Book	Publisher Name
1	Jayashree ghosh, S	2003	A textbook of pharmaceutical chemistry	Sultan and Chand & Co., New Delhi
2	Lakshmi. S	2004	Pharmaceutical Chemistry	Sultan Chand & Sons, New Delhi
3	Chatwal C.R	2015	Medicinal chemistry	Himalaya Publishing House, New Delhi
4	O'Neil, Maryadele J.	2006	The Merck index : an encyclopedia of chemicals, drugs, and biological	Whitehouse Station, NJ : Merck

### Reference Books

S.No.	Authors Name	Year of Publication	Title of the Book	Publisher Name
1.	Ashutosh kar	1992	Medicinal Chemistry	New Age International
2.	<u>William O. Foye</u>	2008	Principles of medicinal chemistry	Lippincott Williams and Wilkins
3.	Gareth Thoma	2003	Fundamentals of Medicinal Chemistry	Joh Wiley & Sons Ltd
4.	Kasture A. V. and Dr.Wadodkar S.G	2014	Pharmaceutical Chemistry	Nirali prakasan
5.	Sweetman, Sean C.	2005	Martindale: the complete drug reference	London: Pharmaceutical Press

**Pedagogy**

E-content, Lecture, Power Point Presentation, Seminar, Assignment, Quiz, Group discussion, Video/Animation.

**Course Designers**

**Dr. V. Sangu**, Assistant Professor, Department of Chemistry

**Mrs.S. Jeevitha**, Assistant Professor, Department of Chemistry