

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Accredited by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI-614016.

TAMILNADU, INDIA.



B.Sc., CHEMISTRY

COURSE STRUCTURE WITH SYLLABUS UNDER CBCS

(For the candidates admitted in the academic year 2022-2023)



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B.Sc., CHEMISTRY COURSE STRUCTURE UNDER CBCS

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(For the candidates admitted in the academic year 2022–2023)

ELIGIBILITY: Those who have completed +2 examinations with Chemistry and Maths/ Biology or Botany/Zoology as two of the core subjects.

Sem.	Part	Nature of the Course	Title of the Course	Course Code	Inst. Hours/Week	Credit	Exam Hours	Marks		Total
								CIA	ESE	
I	I	Language Course(LC)-I- Tamil*/Other Languages**#	Ikkala Ilakkiyam	22LC101	6	3	3	25	75	100
	II	English Language Course (ELC)-I	Language through Literature –I (Prose and Communication Skills)	22ELC101	6	3	3	25	75	100
	III	Core Course(CC)-I	General Chemistry–I	22CH101	6	5	3	25	75	100
				22CH102P	3	3	3	40	60	100
		Allied Course(AC)-I	Mathematics -I Calculus /Botany–I	22AMM101/ 22ABO101	4	3	3	25	75	100
				22AMM102 / 22ABO102P	3	2	3	25	75	100
	Allied Course (ACII) / Allied Practical (AP)-I	Mathematics – II Algebra & Analytical Geometry (3D) / Botany(PI)		3	2	3	40	60	100	
				3	2	3	40	60	100	
	IV	Value Education	Value Education	22UGVED	2	2	3	25	75	100
		TOTAL			30	21	-	-	-	700
	I	Language Course (LC) –II- Tamil*/Other	Idaikkala Ilakkiyamum Pudhinamum	22LC201	6	3	3	25	75	100

		Languages***#									
II	II	English Language Course(ELC)-II	Language through Literature –II (Poetry and Communication Skills)	22ELC201	6	3	3	25	75	100	
		Core Course(CC)-II	General Chemistry–II	22CH203	6	5	3	25	75	100	
		Core Practical(CP) -II	Organic & Inorganic Preparations(P)	22CH204P	3	3	3	40	60	100	
	III		Allied Course AC -III / Allied Course AC -II	Mathematics-III Trigonometry &Fourier series / Botany II	22AMM203 / 22ABO203	3	2	3	25	75	100
						3	2	3	40	60	100
			Allied Course (AC)- IV / Allied Practical (AP) - II	Mathematics –IV Differential Equations and Laplace Transforms / Botany(PII)	22AMM204 / 22ABO204P	4	3	3	25	75	100
	IV		Environmental Studies	Environmental Studies	22UGCES	2	2	3	25	75	100
		TOTAL				30	21	-	-	-	700
III	I	Language Course (LC) –III Tamil*/Other Languages***#	Kaapiyamum Naadakamum	22LC301	6	3	3	25	75	100	
	II	English Language Course(ELC)-III	Language through Literature III (Drama and Communication Skills)	22ELC301	6	3	3	25	75	100	
	III		Core Course(CC)-III	General Chemistry–III	23CH305	6	5	3	25	75	100
			Core Practical(CP)-III	Organic Analysis(P)	23CH306P	3	3	3	40	60	100
			Allied Course(AC)-III	Allied Physics-I	23APY301	4	3	3	25	75	100

		Allied Practical(AP)-II	Allied Physics Practical-I	23APY302P	3	2	3	40	60	100
IV		Non Major Elective I-for those who studied Tamil under Part-I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil up to +2but opt for other languages in degree programme	Non Major Elective I-for those who studied Tamil under Part-I b) Basic Tamil for other language students c) Special Tamil for those who studied Tamil up to+2 but opt for other languages in degree Programme		2	2	3	25	75	100
		TOTAL			30	21	-	-	-	700
IV	I	Language Course (LC)-IV-Tamil*/Other Languages**#	Pandaiya Ilakkiyam	22LC401	6	3	3	25	75	100
	II	English Language Course(ELC)-IV	Language through Literature I (Short stories and Communication Skills)	22ELC401	6	3	3	25	75	100
	III	Core Course(CC)-IV	General Chemistry–IV	23CH407	4	4	3	25	75	100
		Core Practical(CP)-IV	Semimicro Analysis(P)	23CH408P	3	3	3	40	60	100
		Allied Course(AC)-IV	Allied Physics–II	23APY403	4	3	3	25	75	100
		Allied Practical(AP)-IV	Allied Physics Practical-II	23APY404P	3	2	3	40	60	100
IV	Non Major Elective (NME)-II –for those whostudiedTamil under Part I a)Basic Tamil for other language students b)Special Tamil for those who studiedTamil upto+2but opt for	Non Major Elective II-for those who studiedTamil under Part-I a)BasicTamil for other language students b)SpecialTamilfor those who studied Tamil up to+2 but opt forother languages in		2	2	3	25	75	100	

		otherlanguages in degree Programme	degree.								
		Skill Based Elective(SBE)-I	Chemistry of Milk and Milk Products	23SBECHI	2	2	3	25	75	100	
		TOTAL			30	22	-	-	-	800	
V	III	Core Course(CC)-V	Inorganic Chemistry	R23CH509	5	5	3	25	75	100	
		Core Course(CC)-VI	Organic Chemistry– I	R23CH510	6	6	3	25	75	100	
		Core Course(CC)-VII	Physical Chemistry–I	R23CH511	6	6	3	25	75	100	
		Core Practical(CP)-V	Physical Chemistry Practical	R23CH512P	3	3	3	40	60	100	
		Major Based Elective(MBE)-I	Analytical Chemistry/ Material & Nano Chemistry	R23MBECH1:1/1:2	4	3	3	25	75	100	
	IV	Skill Based Elective(SBE)-II	Textile Chemistry	R23SBECH2	2	2	3	25	75	100	
		Skill Based Elective(SBE)-III	Polymer Chemistry	R23SBECH3	2	2	3	25	75	100	
		Soft Skills Development	Soft Skills Development	23UGSDC	2	2	3	25	75	100	
			TOTAL			30	29	-	-	-	800
	VI	III	Core Course (CC)-VIII	Organic Chemistry–II	R23CH613	6	6	3	25	75	100
Core Course(CC)-IX			Physical Chemistry–II	R23CH614	6	6	3	25	75	100	
Core Practical(CP)-VI			Gravimetric Analysis(P)	R23CH615P	6	3	3	40	60	100	
Major Based Elective(MBE)-II			Nuclear, Industrial Chemistry & Metallic state /Solid State Chemistry	R23MBECH2:1/2:2	5	3	3	25	75	100	

	Core Course(CC)-X	Group Project	R23CHPW	6	6	3	25	75	100
V	Extension Activities	**Extension Activities		-	1	-	-	-	-
	Gender Studies	Gender Studies	23UGGS	1	1	3	25	75	100
TOTAL				30	26	-	-	-	600
GRAND TOTAL				180	140	-	-	-	4300

CURRICULAM DESIGN

LIST OF ALLIED COURSES

ALLIED COURSE I-MATHEMATICS/BOTANY ALLIED COURSE II PHYSICS

Subject	No.of Courses	Total Credits
Language Part-I	4	12
English Part-II	4	12
Core Course	9	44
Core Practical	6	18
Allied Course	4	12
Allied Practical	4	08
Non-Major Elective	2	04
Skill Based Elective	3	06
Major Based Elective	2	10
Project	1	06
Environmental Studies	1	02
Value Education	1	02
Soft Skill Development	1	02
Gender Studies	1	01
Extension Activities	-	01 (Credit only)
Total	43	140

*For those who studied Tamil up to 10th+2 (Regular Stream);

+Syllabus for other Languages should be on part with Tamil at degree level;#those who studied Tamil up to 10th+2butoptfor other Languages in degree level under Part I should study special Tamil in PartIV;

**Extension Activities shall be outside instruction hours.

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	40	60
3. Separate passing minimum prescribed for CIA and ESE		

FOR THEORY

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

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

FOR PRACTICAL

The pass in minimum for CIA shall be 40% out of 40 marks [i.e.16marks] the pass in minimum for ESE shall be 40% out of 60 marks

[i.e.24marks]

NON-MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Nature of the Course	Course Code	Title of the Course
III	NME –I	22NMECH31	Agricultural Chemistry
IV	NME-II	22NMECH42	Health Chemistry

SKILL BASED ELECTIVE (SBE) OFFERED BY THE DEPARTMENT CHEMISTRY

Semester	Nature of the Course	Course Code	Title of the Course
IV	SBE –I	22SBECH1	Chemistry of Milk and Milk Products
V	SBE –II	R23SBECH2	Textile Chemistry
V	SBE –III	R23SBECH3	Polymer Chemistry

VALUE ADDED COURSE OFFERED BY THE DEPARTMENT

Semester	Nature of the Course	Course Code	Title of the Course
II	VAC-I	22CHVA1	Phyto chemistry
VI	VAC-II	22CHVA2	Applied Chemistry



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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

(For the candidates admitted in the academic year 2022–2023)

Question Paper Pattern-(Theory)

Maxtime:3Hours

MaxMarks:75

Section –A (10X2 =20)

Answer all the Questions

Answer in One or Two Sentences Each

1. } Unit I
2. }
3. } Unit II
4. }
5. } Unit III
6. }
7. } Unit IV
8. }
9. } Unit V
10. }

Section – B (5 x 5 = 25)

Answer all the questions

Each answer should not exceed 500 words

11. a (or) } Unit I
12. b }

- 12 .a (or) } Unit II
- b }

13. a (or) } Unit III
- b }

b.

14. a (or) } Unit IV
b }

15. a (or) } Unit V
b }

Section – C (3 x 10 = 30)

Answer any THREE questions in 1200 words

- 16. Unit I
- 17. Unit II
- 18. Unit III
- 19. Unit IV
- 20. Unit V

SEMESTER I



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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: I-CC-I: General Chemistry-I

Ins. Hrs. /Week: 6

Course Credit: 5

Course Code:

UNIT I PERIODIC PROPERTIES

Quantum Numbers, Filling up of atomic orbitals: Pauli's exclusion principle, Aufbau Principle, Hund's rule of maximum multiplicity – electronic configuration. Stability associated with half-filled and completely filled orbitals. Inert Pair effect. Periodic properties of elements – variation of atomic volume, atomic and ionic radii, ionization potential, electron affinity, electronegativity along periods and groups. Pauling scale of electronegativity, Mulliken's Scale of electronegativity. Classification of elements into s, p, d and f block elements.

UNIT II ANALYTICAL METHODS

Qualitative Inorganic Analysis – Dry Test, flame test, cobalt nitrate test – wet confirmatory test for acid radicals, interfering acid radicals – elimination of interfering acid radicals.

Solubility product, common ion effect, complexation, oxidation-reduction reactions involved in identification of anions and cations – separation of cations into groups – Semi micro analysis of simple salts.

Volumetric analysis – preparation of standard solutions – normality, molarity and molality by titrimetric reactions – acid-base, redox, precipitation and complexometric titrations – indicators – effect of change in PH – selection of suitable indicators.

UNIT –III ALKANES , REACTIVE INTERMEDIATES AND METHODS FOR REACTION MECHANISMS

Introduction: Inductive, mesomeric, electromeric effects and hyper conjugation – structure of organic molecules based on sp³, sp² and sp hybridization. Alkanes – sources of alkanes – general preparation – general properties – conformational analysis of ethane and n-butane.

Carbocations, Carbanions, Carbenes and Nitrenes: Generation and stability of reactive intermediates – Correlation of reactivity with structure of reactive intermediates. Free radicals: Generation, stability, identification methods – Free radical halogenation reactions and their mechanism.

Homolytic and Heterolytic cleavages of bonds, Characteristics of nucleophilic, electrophilic and free radical reactions. Thermodynamic and kinetic aspects, Hammond's postulates, isotope effects. Energy profile diagrams – Intermediate versus transition state, Product analysis and its importance, crossover experiments, kinetic methods, Isotopic effects.

UNIT IV CHEMISTRY OF CYCLOALKANES, ALKENES, DIENES AND ALKYNES

Preparation of cycloalkanes – Chemical properties – Relative stability of cyclo propane to cyclo octane – Baeyer's Strain theory – Limitations – Mono and disubstituted cyclo hexanes.

Alkenes: Nomenclature – Petroleum source of alkenes and aromatics – General methods of preparation of alkenes – Chemical properties – Markovnikov's rule and peroxide effect-Uses – Elimination reactions and its mechanisms (E1,E2).Dienes: Structures and properties – conjugated dienes – stability and resonance– electrophilic addition – 1,2 addition and 1,4 addition. Alkynes: Nomenclature – General methods of preparation – Physical properties – Chemical properties – Uses.

UNIT V COLLOIDS AND MACROMOLECULES

Definition and types of Colloids – preparation – Purification (dialysis), Electrodialysis (Ultrafiltration) and stability of colloids – gold number-Properties of colloids – kinetic, optical Properties –Tyndall effect –Kinetic Properties Brownian movement.

Emulsions – Types of emulsions, preparation, properties and applications- Donnan membrane equilibrium. Osmosis – reverse osmosis and desalination- Macromolecules – Molecular weight of macromolecules – determination of molecular weight by osmotic pressure and light scattering methods.

COURSE OUTCOME

The students should be able to

1. Basic concepts in organic chemistry electrophiles, nucleophiles, reactive intermediates types of reactions, concept of isomerism etc....
2. Gain knowledge about various quantum numbers and occupancy of electrons on various quantum levels
3. Understand the theory behind the volumetric analysis, which gives the information about the concentration, and Primary & Secondary standards.
4. Know about organic compound with various functional groups and naming of organic compounds.
5. Acquire basic knowledge of reactive intermediates and mechanism of organic reactions.
6. Familiar with methods and instrumentation on characterization of colloidal system

TEXT BOOKS

1. Glasstone S, Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co Ltd.
2. Gopalan R, Subramanian PS, Renga rajan K. 2000. Elements of Analytical Chemistry, 2nd edition, Sultan Chand & Sons,
3. Madan RD. 2000. Modern Inorganic Chemistry, 2nd edition, S. Chand & Company Ltd.,
4. Puri BR, Sharma LR, Kalia KK. 1993. Principles of Inorganic Chemistry, 23rd edition, New Delhi, Shoban Lal Nagin Chand & Co.,
5. Puri BR, Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, 35th

- edition, New Delhi: Shoban LalNaginchand and Co.
- Soni PL. 2000. Text book of Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.
 - Sp. Banerjee, Advanced Inorganic Chemistry 2ndedn, Vol-1, Arunabha Sen, Booksand Allied (P) Ltd., Kolkata, 2017.
 - B.R.Puri, L.R.Sharma and M.S.Pathania, Principles of Physicalchemistry.47thedn,Vishal Publishing Co., 2017.
 - N. Kundu and S.K. Jain, Physical Chemistry, S. Chand & Company Ltd. 2000
 - G.M.Barrow, Physical Chemistry, 6th edn, McGraw-Hill Inc., US, 1996.

REFERENCES

- Madan .R.D., “Modern Inorganic Chemistry”, 2nd edition, Chand .S & CompanyLtd., 2000.
- Soni P.L, “Text book of Inorganic Chemistry”, 20th revised edition, Sultan Chand & Sons, 2000.
- Puri .B.R, Sharma, L.R, Kalia .K.K, Principles of Inorganic Chemistry, 23rd edition,New Delhi, Shoban Lal Nagin Chand & Co., (1993).
- Lee .J.D, ‘Concise Inorganic Chemistry’, 20th revised edition, Sultan Chand & Sons, 2000.
- Gopalan.R, Subramanian.P.S.& Rengarajan.K,“Elements of Analytical Chemistry”, 2nd edition, Sultan Chand & Sons, 1000.
- Morrison.R.T. and Boyd, Bhattacharjee.R.N, S. K. Organic Chemistry (7th edition), Pearson, India, (2011).
- Bahl.B.S,and Bahl, A., Advanced Organic Chemistry, (12th edition), New Delhi,Sultan Chand & Co., (2010).
- Jerry March, “Advanced Organic Chemistry, Reaction, Mechanism and Structure”,7th Edition, Wiley Inter Science (2013).
- Puri B.R., Sharma L.R. and Pathania M.S. Principles of Physical Chemistry, (35th edition), New Delhi: Shoban Lal Nagin chand and Co. (2013)
- Glasstone S. and Lewis D., Elements of Physical Chemistry, London, Mac Millan &Co Ltd.

E-RESOURCES

- <https://www.acs.org/content/acs/en/education/whatischemistry/periodictable/educational-resources-for-ages-15-18.html>
- [https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_\(Inorganic_Chemistry\)/Descriptive_Chemistry/Periodic_Trends_of_Elemental_Properties/Periodic_Properties_of_the_Elements](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_(Inorganic_Chemistry)/Descriptive_Chemistry/Periodic_Trends_of_Elemental_Properties/Periodic_Properties_of_the_Elements)
- <https://usiu-ke.libguides.com/c.php?g=1078819&p=7860033>
- <https://courses.lumenlearning.com/suny-potsdam-organicchemistry/chapter/5-6-reactive-intermediates/>
- <https://wou.edu/chemistry/courses/online-chemistry-textbooks/ch105-consumer-chemistry/ch105-chapter-7/>
- https://chem.libretexts.org/Courses/Heartland_Community_College/HCC%3A_Chem_162/22%3A_An_Introduction_to_Organic_Chemistry/22.2%3A_Alkanes%2C_Cycloalkanes%2C_Alkenes%2C_Alkynes%2C_and_Ar

omatics

7. <https://byjus.com/jee/colloids/>
8. <https://pubs.acs.org/journal/mamobx>
9. <https://authors.library.caltech.edu/25034/13/BPOCchapter12.pdf>
10. <https://authors.library.caltech.edu/25034/13/BPOCchapter12.pdf>

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Semester: I-CP-I: Volumetric Analysis (P)

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

Titrimetric Quantitative Analysis

I. Acidimetry – Alkalimetry

1. Estimation of Hydrochloric acid
2. Estimation of Sodium Carbonate

II. Permanganometry

3. Estimation of ferrous iron in Mohr's salt
4. Estimation of oxalic acid

III. Iodo and Iodimetry

5. Estimation of copper
6. Estimation of potassium permanganate

IV. Determination of Hardness

7. Estimation of Hardness of Water.

Scheme of Valuation:	Max.Marks
Record	5(Marks)
Procedure Writing	10(Marks)
Results	
<1%	- 45 Marks
1-2%	-35 Marks
2-3%	-25 Marks
3- 4%	- 15 Marks
>4%	- 10 Marks

COURSE OUTCOME

The Student should able to do

1. Understand the apparatus used in volumetric analysis and correct titrimetric Analysis

2. Determine the concentration of acidic and basic solutions
3. Applying the principles of titremetry
4. Identify the concentrations of indicator and dilution.
5. Handling the glasswares and chemicals in a safety manner.

TEXT BOOKS

1. Venkateswaran V, Veerasamy R, Kulandaivelu AR. 2006. Basic principles of Physical Chemistry Second edition, Sultan Chand & Sons, New Delhi.

REFERENCE BOOKS

1. Vogel's Text Book of Qualitative Chemical Analysis, 5th edn. ELBS/ Longman England.
2. Vogel's Text Book of Quantitative Chemical Analysis. 1989. 5th edition, ELBS/ Longman England.

E-RESOURCES

1. <https://www.accessengineeringlibrary.com/content/book/9780071745925/chapter/chapter25>
2. <https://chemistryvce.weebly.com/volumetric-analysis.html>
3. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Quantifying_Nature/Volumetric_Chemical_Analysis_\(Shiundu\)/14.2%3A_Learning_Activity](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.2%3A_Learning_Activity)
4. <https://byjus.com/chemistry/volumetric-analysis/>
5. https://www.researchgate.net/publication/344658899_Volumetric_Analysis_-_Titration_for_Beginners



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620024

Applicable to the candidates admitted from the Academic year 2018-19 onwards

Part IV - VALUE EDUCATION (Revised Syllabus)

Unit I : Philosophy of Life and Social Values

Human Life on Earth (Kural 629) Purpose of Life (Kural 46) Meaning and Philosophy of Life (Kural 131, 226) Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

Unit II : Human Rights and Organizations

Definitions, Nature of Human Rights. Universal Declaration of Human Rights, International covenant on Civil and Political Rights - International covenant of Economic, Social and Cultural Rights. Amnesty International Red Cross. Contemporary Challenges: Child Labour – Women’s Right - Bonded Labour - Problems of refugees - Capital punishment. National and State Human Rights Commissions

Unit III : RTI Act, 2005 & Consumer Protection Act, 1986

Definition of RTI Act, 2005 and obligations of Public Authorities – The Central Information Commission – The State Information Commission – Powers and Functions of the Information Commissions – Appeal and Penalties.
Definition of the Consumer Protection Act, 1986 – State and Central Consumer Protection Councils – Consumer Disputes Redressal Agencies.

Unit IV : Yoga and Health

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga
- Yoga practices: Asanas, Pranayama and Meditation.

Unit V : Role of State Public Service Commission

Constitutional provisions and formation - Powers and Functions - Methods of recruitment - Rules and notification, syllabi for different exams
- written and oral - placement.

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. kqVgGxt! .!q/B/Ohih! .! Nrgqz! olipqbiggkKme! dli!F~z!/outqbQmmgl?! kRsi U,I/
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialectics and Dynamics of Human Rights in India, TagoreLaw Lectures.
5. Yogic Therapy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedapatti, 1999.
7. Right to Information Act, 2005-
Website:www.tnpsc.gov.in/RTI%20ACT%202005.pdf
8. The Consumer Protection Act, 1986 – Website:
http://ncdrc.nic.in/bare_acts/consumer%20Protection%20Act1986.html

SEMESTER II



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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Ins. Hrs./Week: 6 **Semester: II-CC-II: General Chemistry-II**
Course Credit: 5 **Course Code:**

UNIT I CHEMICAL BONDING

Ionic bond – formation, variable electrovalency – Lattice energy, Born – Haber Cycle. Covalent bond - formation, variable covalency, maximum covalency, covalent character in ionic bond – Fajans Rule. Polarisation – partial ionic character of a covalent bond.

VB theory, MO theory – Basic principles of bonding and antibonding orbitals, applications of MOT to H_2 , He_2 , N_2 & O_2 – molecular orbital sequence, comparison of VB & MO Theories.

Hybridisation – Formation of $BeCl_2$ & BCl_3 . VSEPR theory of simple inorganic molecules – $BeCl_2$, $SiCl_4$, PCl_5 , SF_6 , IF_7 , XeF_6 , BF_3 & H_2O .

Hydrogen bonding – Intermolecular & Intramolecular H_2 – bonding and its consequences.

UNIT II CHEMISTRY OF S- BLOCK & ZERO GROUP ELEMENTS AND METALURGY

General characteristics of s-block elements – comparative study of elements – alkali metals and their hydroxides, oxides and halides, alkaline earth metals and their oxides, carbonates and sulphates.

Diagonal relationship of Li & Mg, Be & Al, chemistry of NaOH, KI & $Mg(NH_4)PO_4$.

Metallurgy : Occurrence of metals – concentration of ores – froth floatation, magnetic separation, calcination, roasting, smelting, flux, aluminothermic process, purification of metals – electrolysis, zone refining, van Arkel de-Boer process.

Zero group elements – position in the periodic table, occurrence, isolation, applications, and compounds of Xe – XeF_6 & $XeOF_4$.

UNIT III CHEMISTRY OF BENZENE AND BENZENOID COMPOUNDS

Aromaticity – Huckle's rule - structure of benzene– Benzene-preparation, chemical properties and uses. Aromatic electrophilic substitution reactions and mechanism – Orientation and reactivity in substituted benzenes.

Polynuclear aromatic hydrocarbons – Nomenclature, Naphthalene from coal tar and petroleum – Laboratory preparation, Structure of Naphthalene, Aromatic character, Physical properties, Chemical properties, Uses. Mechanism of Aromatic electrophilic substitution – Theory of orientation and reactivity.

Anthracene, Phenanthrene from coal tar and petroleum, Laboratory preparation, Molecular Orbital structures, Aromatic Characters, Physical Properties, Chemical properties and uses. Preparation of biphenyls, Physical and Chemical properties and

uses.

UNIT IV ALKYL AND ARYL HALOGENS

Nomenclature of haloalkanes – structure - general preparations of haloalkanes - physical and chemical properties and uses.

Nucleophilic aliphatic substitution reaction mechanisms (SN1 and SN2) – Stereochemical aspects.

Halobenzenes: Theory of orientation and reactivity - general preparation – properties - uses. Electrophilic and nucleophilic aromatic substitution reaction mechanisms.

UNIT V ATOMIC STRUCTURE AND BASIC QUANTUM MECHANICS

Atomic Structure : Bohr's model of atom and its limitations, dual behavior of matter and radiation, de-Broglie's relation, Heisenberg Uncertainty principles Atomic spectrum of hydrogen. Zeeman effect .Molecules –molecular weight mole-Avagadro number-calculating number of moles,

Quantum Mechanics: Fundamental postulates of quantum mechanics. Time independent Schrodinger equation and meaning of various term in it. Significance of Ψ and Ψ^2 .Schrodinger equation for hydrogen atom .Radial and angular parts of the wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3p and 3d orbitals (Only graphical representation).

COURSE OUTCOME

The Student should able to do

1. Understand the common themes running through ionic, covalent and metallic descriptions of chemical bonding
2. Describe the chemistry of metallurgy and s-block elements and learn the chemistry of halogen and zero group elements.
3. Distinguish the aromatic and antiaromatic compounds by their structures.
4. Identify the functional group of alkyl halides in a carbon-halogen bond.
5. Gaining the knowledge about atomic models and basic concept of Quantum theory.

TEXT BOOKS

1. Gopalan R, Subramanian PS, Rengarajan K. 1991. Elements of Analytical Chemistry, 2nd edition, Sultan Chand & Sons.
2. Madan RD. 2000. Modern Inorganic Chemistry, 2nd edition, S. Chand & Company Ltd.,
3. Puri BR, Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, 35th edition, New Delhi: Shoban Lal Nagin chand and Co.
4. Puri BR, Sharma LR, Kalia KK. 1993. Principles of Inorganic Chemistry, 23rd edition, New Delhi, Shoban Lal Nagin Chand & Co.,
5. Soni PL. 2000. Text book of Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.

REFERENCE BOOKS

1. R.D. Madan, "Modern Inorganic Chemistry", 2nd edition, S. Chand & Company Ltd., 2000.
2. P.L. Soni, "Text book of Inorganic Chemistry", 20th revised edition, Sultan Chand & Sons, 2000.
3. B.R. Puri, L.R. Sharma, K.K. Kalia, Principles of Inorganic Chemistry, 23rd edition, New Delhi, Shoban Lal Nagin Chand & Co., (1993).
4. J.D. Lee, 'Concise Inorganic Chemistry', 20th revised edition, Sultan Chand & Sons, 2000.
5. R. Gopalan, P.S. Subramanian & K. Rengarajan, "Elements of Analytical Chemistry", 2nd edition, Sultan Chand & Sons, 1991.
6. Morrison R.T. and Boyd R.N., Bhattacharjee S. K. Organic Chemistry (7th edition), Pearson India, (2011).
7. Bahl B.S. and Bahl A., Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (2010).
8. Jerry March, "Advanced Organic Chemistry, Reaction, Mechanism and Structure", 7th Edition, Wiley Inter Science (2013).
9. Puri B.R., Sharma L.R. and Pathania M.S. (2013) Principles of Physical Chemistry, (35th edition), New Delhi: Shoban Lal Nagin Chand and Co.
10. Bahl B.S., Arun Bahl and Tuli G.D. (2012). Essentials of Physical Chemistry, New Delhi: Sultan Chand and Sons.

E- RESOURCES

1. <https://edu.rsc.org/resources/chemical-bonding/1140.article>
2. [https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_\(Inorganic_Chemistry\)/Chemical_Compounds/Introduction_to_Chemical_Bonding](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_(Inorganic_Chemistry)/Chemical_Compounds/Introduction_to_Chemical_Bonding)
3. <https://ncert.nic.in/textbook/pdf/kech203.pdf>
4. <https://www.sanfoundry.com/chemistry-questions-answers-s-block-elements-group-1-elements-alkali-metals/>
5. <https://www.elsevier.com/books/an-introduction-to-the-chemistry-of-benzenoid-compounds/tomlinson/978-0-08-015659-0>
6. [https://chem.libretexts.org/Bookshelves/Introductory_Chemistry/Book%3A_The_Basics_of_GOB_Chemistry_\(Ball_et_al.\)/13%3A_Unsaturated_and_Aromatic_Hydrocarbons/13.08%3A_Structure_and_Nomenclature_of_Aromatic_Compounds](https://chem.libretexts.org/Bookshelves/Introductory_Chemistry/Book%3A_The_Basics_of_GOB_Chemistry_(Ball_et_al.)/13%3A_Unsaturated_and_Aromatic_Hydrocarbons/13.08%3A_Structure_and_Nomenclature_of_Aromatic_Compounds)
7. <https://byjus.com/chemistry/preparation-alkyl-halides/>
8. <http://www.masterjeeclasses.com/wp-content/uploads/2018/12/12.ALKYL-HALIDES-ARYL-HALIDES-AND-AROMATIC-COMPOUNDS-THEORY.pdf>
9. [https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Map%3A_Physical_Chemistry_for_the_Biosciences_\(Chang\)/11%3A_Quantum_Mechanics_and_Atomic_Structure/11.E%3A_Quantum_Mechanics_and_Atomic_Structure_\(Exercises\)](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Map%3A_Physical_Chemistry_for_the_Biosciences_(Chang)/11%3A_Quantum_Mechanics_and_Atomic_Structure/11.E%3A_Quantum_Mechanics_and_Atomic_Structure_(Exercises))
10. <https://www.jove.com/science-education/11677/electronic-structure-of-atoms>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016

(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Semester: II-CP-II: Organic and Inorganic Preparations (P)

Ins. Hrs. /Week: 3

Course Credit: 3

Course Code:

Organic Preparation

1. Preparation of organic compounds involving the following chemical conversion.
2. Oxidation – Benzaldehyde to benzoic acid
3. Hydrolysis–Methyl Salicylate to Salicylic Acid , Ethyl Benzoate to Benzoic Acid
4. Nitration– Phenol to Picric Acid

Inorganic Preparation

1. Tris (thiourea) Copper I chloride
2. Tetraammine Copper (II) sulphate
3. Potassium Trioxalato aluminate(III)

COURSE OUTCOME

The Student should able to do

1. Exposure in the understanding and mechanisms of organic oxidations, reductions, the generation and reactions of organic reaction.
2. Trained on performing the experiments involving the synthesis of organic Compounds
3. Gained a knowledge to carry out an organic reaction, including isolating, purifying and characterizing the product
4. Key concepts of inorganic and organometallic chemistry including those related to synthesis, reaction chemistry, and structure and bonding
5. Understand of all the fundamental concepts inorganic chemistry

TEXT BOOK(S)

1. Venkateswaran V, Veerasamy R. Kulandaivelu AR. 2006. Basic principles of Physical Chemistry” Second edition, Sultan Chand & Sons, New Delhi.

REFERENCE BOOK(S)

1. Venkateswaran V, Veerasamy R. Kulandaivelu AR. 1997. Basic Principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons.
2. Vogel AI. 2000. Textbook of Quantitative Inorganic Analysis; 6th Ed., Longman, New Delhi.

E- RESOURCES

1. <https://library.cuny.cuny.edu/chemistry/inorganic>
2. <https://www.library.illinois.edu/chx/e-resources/>
3. <https://www.quora.com/What-are-the-best-resources-to-learn-organic-chemistry-on-my-own>

4. <https://guides.lib.wayne.edu/chemistry/orgochem>
5. <https://byjus.com/chemistry/difference-between-organic-and-inorganic-compounds/>



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620 024
ENVIRONMENTAL STUDIES

(Applicable to the candidates admitted from the Academic year 2019-20 onwards)

Unit: 1 The Multidisciplinary nature of environmental studies
Definition, scope and importance. **(2 lectures)**
Need for public awareness

Unit: 2 Natural Resources:
Renewable and non-renewable resources:
Natural resources and associated problems.
a) Forest resources: use and over-exploitation, deforestation, case studies.
Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams' benefits and problems.
c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
f) Land resources: Land as a resource, land degradation, man induced Landslides, soil erosion and desertification.
Role of an individual in conservation of natural resources.
Equitable use of resources for sustainable lifestyles.
(8 lectures)

Unit: 3 **Ecosystems**
Concept of an ecosystem.
Structure and function of an ecosystem.
Producers, consumers and decomposers
Energy flow in the ecosystem
Ecological succession.
Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:-
a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)
(6 lectures)

Unit: 4 **Biodiversity and its conservation**
Introduction – Definition: Genetic, species and ecosystem diversity Bio

geographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
Biodiversity at global, National and local levels India as a mega-diversity nation
Hot-spots of biodiversity
Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
Endangered and endemic species of India
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of:

- a. Air Pollution
- b. Water Pollution
- c. Soil Pollution
- d. Marine Pollution
- e. Noise pollution
- f. Thermal Pollution
- g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution

Pollution case studies

Disaster management: floods, earthquake, cyclone and landslides.

Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

(8 lectures)

Unit: 6 Social Issues and the Environment

From Unsustainable to Sustainable development. Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns.

Case studies

Environmental ethics: Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

Wasteland reclamation.

Consumerism and waste products. Environment

Protection Act.

Air (Prevention and Control of Pollution) Act.

Water (Prevention and Control of Pollution)

Act.Wildlife Protection Act.
Forest Conservation Act.
Issues involved in enforcement of environmental legislation
Public awareness.

(7 lectures)

Unit: 7 Human Population and the Environment

Population growth, variation among nations.
Population explosion – Family Welfare
Programmes Environment and human health
Human Rights - Value Education
HIV/ AIDS - Women and Child Welfare
Role of Information Technology in Environment and human
healthCase studies.

Unit: 8 Field Work

Visit to a local area to document environmental assets-river /
forest/grassland/ hill / mountain

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clarendon Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ

- House, Meerut.
18. Survey of the Environment, the Hindu (M).
 19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
 20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
 21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
 22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p (M) Magazine (R) Reference (TB) Textbook
 23. <http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%20Rules,%202004.pdf>.

ALLIED CHEMISTRY

SEMESTER I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF CHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: I-AC-I: Allied Chemistry-I

Ins. Hrs. /Week: 4

Course Credit: 3

Course Code:

UNIT I INDUSTRIAL CHEMISTRY

Industrial Chemistry: Fuel gases – Water gas- producer gas- LPG gas- Gobar gas and naturalgas. Fertilizers – NPK and mixed Fertilizers- soaps and detergents.

Cumene process for phenol manufacturing; Manufacturing of Paracetamol, Chlorophenicol- Preparation of Shampoo.

UNIT II ELECTRON DISPLACEMENT EFFECTS AND HALOGEN COMPOUNDS

Polar effects: Inductive effect – Relative Strength of Aliphatic mono carbocyclic acid and aliphatic amines. Resonance – Condition for resonance. Consequences of resonance – resonance of energy. Basic property of aniline and acidic property of phenol. Hyperconjugation – Heat of hydrogenation - Bond length and dipole moment- Steric effect. Halogen containing compounds: Important chlorohydrocarbons used as solvents. Pesticides – Dichloromethane -chloroform - carbon tetrachloride-DDT and BHC Types of solvents: - Polar, Nonpolar.

UNIT III AROMATIC COMPOUNDS AND ORGANIC REACTIONS

Aromatic compounds: Structure, stability resonance and aromaticity of benzene. Substitution reaction: Nitration, Halogenations, Alkylation. Naphthalene – Isolation, properties and uses. Organic reaction: Biuret, Decarboxylation, Benzoin, Perkin, Cannizaro, Claisen and Haloform reactions Chemotherapy: Explanation with two examples each for analgesics, antibacterial, anti- inflammatory, antibiotics, antiseptic and disinfectant, anesthetics local and general (Structures not necessary)

UNIT IV SOLID STATE, ENERGETICS AND PHASE RULE REACTIONS

Solid state: Typical crystal lattices - unit cell, elements of symmetry, Bragg's equation, Weiss Indices, Miller indices, simple body centered and face centered lattices

Energetics: First law of thermodynamics – state and path function – need for the second law – Carnot's cycle and thermo- dynamic scale of temperature, spontaneous and Non-spontaneous processes – entropy – Gibbs free energy.

Phase rule: Phase, component, degree of Freedom, and phase rule definitions - one componentsystem– water system.

UNIT V CHEMICAL EQUILIBRIUM AND CHEMICAL KINETICS

Chemical equilibrium: Criteria of homogeneous and heterogeneous equilibria, - decomposition of HI, N₂O₄, CaCO₃, PCl₅.

Chemical Kinetics: Order of reaction and their determinations - activation energy, effects of temperature on reaction

COURSE OUTCOME

The student should be able to do

1. Achieve the skills required to the chemical industry like cement industries, agro product, Paint industries etc...
2. Define the permanent displacement of electron forming a covalent bond towards the more electronegative element or group.
3. Interpret the concept of aromaticity and the main properties of aromatic compounds
4. Explain crystal systems, Diffraction and Reciprocal space and can explain bonding types in crystals.
5. Describe the difference between “completion” for irreversible chemical reactions and for reversible chemical reactions.

TEXT BOOKS

1. Biswas AK. 1989. Frontiers in Applied Chemistry, Narosa publishing house.
2. Jayashree Ghosh. 2008. Fundamental Concepts of Applied Chemistry, S.Chand&Company Ltd., New Delhi.
3. Thangamma Jacob, Macmillian. 1990. Textbook of Applied Chemistry, India Ltd. Mumbai.

REFERENCE BOOKS

1. Gopalan R. 2012, Text Book of Inorganic Chemistry, 2nd Edition, Hyderabad, Universities Press, India.
2. Morrison R.T. and Boyd R.N. Bhattacharjee S.K. 2011. Organic Chemistry 7th edition, Pearson India.
3. Puri BR. Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, 35th edition, Shoban Lal Nagin Chand and Co New Delhi.

E-RESOURCES

1. <https://pubs.acs.org/journal/iecred>
2. <https://searchworks.stanford.edu/view/4500021>
3. <https://selfstudypoint.in/electron-displacement-effects-in-covalent-bonds/>
4. <https://study.com/academy/lesson/electronic-displacements-in-covalent-bonds.html>
5. <https://guides.lib.wayne.edu/chemistry/orgochem>
6. <https://fordham.libguides.com/Chemistry/OrganicChemistryReference>
7. https://link.springer.com/content/pdf/10.1007%2F978-0-387-46271-4_25.pdf
8. https://link.springer.com/content/pdf/10.1007%2F978-0-387-46271-4_25.pdf
9. [https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_-_The_Central_Science_\(Brown_et_al.\)/14%3A_Chemical_Kinetics/14.S%3A_Chemical_Kinetics_\(Summary\)](https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_-_The_Central_Science_(Brown_et_al.)/14%3A_Chemical_Kinetics/14.S%3A_Chemical_Kinetics_(Summary))
10. <https://www.topperlearning.com/foundation-class-9/chemistry/chemical-kinetics-and-chemical-equilibrium>



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: I-AP-I: Allied Chemistry Practical -I

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

I. Acidimetry and alkalimetry

- (a) Strong acid VS strong base
- (b) Weak acid VS strong base
- (c) Determination of hardness of water

II. Permanganometry

- (a) Estimation of ferrous sulphate
- (b) Estimation of oxalic acid

III. Iodometry

- (a) Estimation of potassiumdichromate
- (b) Estimation of potassiumpermanganate

Scheme for Practical Evaluation.

Volumetric Estimation	-	50 marks
Record	-	10 marks
Internal Assessment	-	40 marks
Volumetric Analysis:	-	50 marks
Procedure	-	15 marks
Results		
<2%	-	50 marks
2-3%	-	40 marks
3-4%	-	30marks
>4%	-	20 marks

COURSE OUTCOME

The student should able to do

1. Determine the strength of a solution of an acid by titration with a standard solution of a base is called acidimetry
2. Enable to manage the neutralization titrations of acidimetry and alkalimetry.
3. Explain the parameters of water.
4. Understand the principles of volumetric and electrochemical analysis and Carryout various volumetric and electrochemical titration
5. Finding the difference between iodometry and iodimetry by standardization of sodium thiosulphate using iodometric titration virtual lab simulation.

TEXT BOOKS

1. Gopalan R. 2000. Elements of analytical chemistry, S. Chand, New Delhi.
2. Gnanapragasam NS, Ramamurthy G. 1998. Organic Chemistry Lab Manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.

REFERENCE BOOKS

1. Peter McPherson. 2014. Practical Volumetric Analysis, Royal Society of chemistry.

E-RESOURCES

1. <https://www.accessengineeringlibrary.com/content/book/9780071745925/chapter/chapter25>
2. <https://chemistryvce.weebly.com/volumetric-analysis.html>
3. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Quantifying_Nature/Volumetric_Chemical_Analysis_\(Shiundu\)/14.2%3A_Learning_Activity](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.2%3A_Learning_Activity)
4. <https://byjus.com/chemistry/volumetric-analysis/>
5. https://www.researchgate.net/publication/344658899_Volumetric_Analysis_-_Titration_for_Beginners

SEMESTER II



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF CHEMISTRY
B.Sc., BIOCHEMISTRY

Semester: II-AC-II: Allied Chemistry-II

Ins. Hrs. /Week: 4

Course Credit: 3

Course Code:

UNIT I NUCLEAR CHEMISTRY

Nuclear Chemistry : Fundamental particles of nucleus- isotopes, isobars, isotones and isomers – differences between chemical reactions and nuclear reactions, nuclear fusion and fission- radioactive series. Nuclear chain reactions- Breeder reaction-Nuclear power plant

UNIT II CARBOHYDRATES, AMINO ACIDS AND PROTEINS

Carbohydrates: classification – glucose and fructose – preparation and properties – structure of glucose Fischer and Haworth cyclic structures.

Amino acids and proteins: Amino acids – Classification based on structure. Essential and non – Essentials amino acids – preparation, properties and uses – peptides (elementary treatment only) – proteins – Classification based on physical properties and biological functions. Structure of proteins – primary and secondary (elementary treatment).

UNIT III HETEROCYCLIC COMPOUNDS, VITAMINS AND DRUGS

Heterocyclic compounds: Furan, pyrrole and pyridine – preparation, properties and uses – basic properties of pyridine and pyrrole.

Vitamins: Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K - Hormones - Functions of insulin and adrenaline. Drugs- Sulpha Drugs - Uses and Mode of action of Sulpha Drugs -- Antibiotics - Uses of Penicillin, Chloramphenicol, streptomycin.

UNIT IV SURFACE AND PHOTO CHEMISTRY

Surface Chemistry: Introduction to surface chemistry adsorption, adsorption physisorption- chemisorptions .Emulsions, gels – preparation, properties - Electrophoresis and applications.

Photochemistry : Laws of photochemistry - Lambert and Beer's law, Grothus Drapper law and Stark Einstein law of photochemical equivalence its and applications.

UNIT V CHROMATOGRAPHIC TECHNIQUES

Introduction to Qualitative and Quantitative Analysis –Error Analysis- Mean, Median, Mode, Standard Deviation (Only Definition) Chromatographic separations - Principles and application of column, paper, thin layer chromatography, HPLC and Gas Chromatography.

COURSE OUTCOME

The Student should able to do

1. Defines radioactive decay processes and nuclear radiation · is able to define and use nomenclature, units and properties of radiation.
2. Explains the structure and properties of carbohydrates and describe the reducing action of sugars.
3. Knows the rules of nomenclature and describe structural, physical, and chemical properties and summarize and discuss various types of Heterocyclic Compounds.
4. Understand the thermodynamics and kinetics of chemical processes.
5. Gains the Knowledge about Theoretical as well as a practical introduction to the principles and techniques of chromatography

TEXT BOOKS

1. Jain JL. 2017. Elementary Bio-Chemistry, 2nd revised edition, S.Chand & Company.
2. Sathyanarayana U. 2019. Essentials of Bio-Chemistry, 3rd edition, Books & Allied Pvt. Ltd.

REFERENCE BOOKS

1. Bahl BS, and Bahl A. 2010, Organic Chemistry, 12th edition, Sultan Chand & Co, New Delhi.
2. Puri B.R, Sharma LR, Kalia KC. 2004-2005. Principles of Inorganic Chemistry, 21st edition, Vallabh Publications.
3. Puri BR, Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, (35th edition), Shoban Lal Nagin Chand and Co, New Delhi.
4. Vaithyanathan S and others. 2019. Textbook of Ancillary Chemistry, 2nd Edition, Priya Publications, Karur.
5. Veeraiyan V. 2016. Text book of Ancillary Chemistry, High amount Publishing house, 14th Edition, (Both in Tamil and English) Chennai.

E-RESOURCES

1. <https://edu.rsc.org/nuclear-chemistry-and-radioactivity/115037.subject>
2. <https://www.iancas.org.in/IANCAS-radiochemistry-resources.php>
3. <https://www.nal.usda.gov/legacy/fnic/protein-and-amino-acids>
4. <https://www.ncbi.nlm.nih.gov/books/NBK554545/>
5. <https://www.openaccessgovernment.org/vitamins-and-drugs-heterocyclic-chemistry-is-all-around-us-and-in-us/46656/>
6. <https://www.sciencedirect.com/topics/chemistry/heterocyclic-compound>
7. <https://www.annualreviews.org/doi/10.1146/annurev.pc.45.100194.000553>
8. <https://www.mdpi.com/journal/molecules/sectioneditors/photochemistry>
9. <https://www.chromatographyonline.com/view/chromatography-resources-for-online-learning>
10. <https://edu.rsc.org/resources/chromatography-techniques/4010255.article>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: II-AP-II: Allied Chemistry Practical-II
Ins. Hrs./Week: 3 Course Credit: 2 Course Code:

Organic Qualitative

Analysis Organic

Analysis

Analyze the following organic Compounds.

1. Carbohydrate
2. Amide
3. Aldehyde
4. Ketone
5. Acid
6. Amine

The students may be trained to perform the specific reactions like tests for elements (nitrogen only), aliphatic or aromatic, saturated or unsaturated and functional group present and record their observations.

Scheme of Evaluation

Organic Qualitative Analysis	50 marks
Identification of Nitrogen	05 marks
Saturated and unsaturated	05 marks
Aliphatic or Aromatic	05 marks
Preliminary reactions with Procedure	15m
Functional group identification Correctly	10
Confirmative test	10
Record	10 marks

COURSE OUTCOME

The Student should be able to do

1. Analyse various organic compounds using documented procedures.
2. Exposure in the understanding and mechanisms of organic oxidations, reductions reactions.
3. Identify, classify, organize, analyze, and draw structures of organic molecules.
4. Understand the nomenclature, structure, bonding and chemical reactivities of carboxylic acid, nitro compounds etc...
5. Distinguish aliphatic and aromatic compounds.

TEXT BOOKS

1. Arthur I Vogel. 2010. Elementary Practical Organic Chemistry second edition, Pearsoneducation.
2. Frederick George Mann, Bernard Charles Saunders. Practical Organic Chemistry, Longman London and New York.
3. Gnanapragasam N Sand Ramamurthy G. 1998. Organic Chemistry Lab Manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.

REFERENCE BOOK(S)

1. Gopalan R. 2000. Elements of Analytical Chemistry, S. Chand, New Delhi,
2. Gnanapragasam NS and Ramamurthy G. 1998. Organic Chemistry Lab Manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.

E-RESOURCES

1. <https://libguides.reading.ac.uk/chemistry/e-resources>
2. <https://organicchemistrydata.org/links/>
3. <https://guides.lib.wayne.edu/chemistry/orgochem>
4. <https://www.masterorganicchemistry.com/resource-guide/>
5. <https://hbu.libguides.com/c.php?g=323451&p=2170081>

SEMESTER III

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester :III-CC-III :General Chemistry-III

Ins.Hrs. /Week:6

Course Credit:5

Course Code: 23CH305

UNIT I Chemistry of P-Block Elements–B, C and N Families (15Hours)

General characteristics of P-block elements-general characteristics of Group III A elements

extraction of boron- Physical and chemical properties of B – uses- chemistry of some compounds of boron: Boric acid, Borax, Diborane-Extraction of Al- physical and chemical properties-uses- chemistry of Alums,Aluminum Oxide.

General characteristics of elements of Group IVA- allotropic forms of carbon – Chemistry of charcoal – Chemistry of oxides of carbon (CO & CO₂) – preparation of silicon – physical and chemical properties of Si– uses –structures of silicates–chemistry of silicones.

UNIT II INTERHALOGEN COMPOUNDS (15 Hours)

Peracids of sulphur, Thionic acids, sodium thiosulphate – preparation, properties, structure and uses. Classification of oxides – acidic, amphoteric, neutral oxides, peroxides and superoxides. Interhalogen compounds, Pseudohalogens, Oxyacids of halogens, Polyhalides and basic nature of iodine.

UNIT III PHENOLS (15 Hours)

Nomenclature; classification, Preparation from diazonium salts, cumene, Dow's process, Raching process; properties – acidic character and effect of substitution on acidity. Reactions – Fries, claisen rearrangement, Electrophilic substitution reactions, Reimer - Teimen, Kolbe, Schmidt, Gatermann synthesis, Libermann, nitro reaction, phthalein reaction. Resorcinol, quinol, picric acid – preparation, properties and uses.

UNIT IV GASEOUS STATE (15 Hours)

Gases – Boyle's law, Charle's law and Avagadro's law- ideal gas equation. Real Gases- deviation from ideal behaviour – van der Waals equation of states derivation – significance of critical constants- law of corresponding states compressibility factor. Inversion temperature and liquefaction of gases- Linde and Claude – demagnetization methods. Maxwell's distribution of molecular velocities (Derivation not needed).Types of molecular velocities- mean, most probable and root mean square velocities-Inter relationships. Collision diameter, mean free path and collision number.

UNIT V SOLID STATES AND LIQUID CRYSTALS (15 Hours)

Classification of solids- Isotropic and anisotropic crystals- elements of symmetry basic seven crystal systems- laws of crystallography- representation of plane smiller indices, space lattice and unit cell. X-ray diffraction- derivation of Bragg's equation- determination of structures of NaCl by Debye Scherrer (powder method) and rotating crystal methods. Types of crystals, close packing of identical solid spheres, interstitial sites, limiting radius ratios (derivation not needed),

radius ratio rule and shapes of ionic crystals, structures of NaCl, CsCl and ZnS.

Total Lecture Hours : 75

COURSE OUTCOME

The student will be able to,

1. Understand general trends in the chemistry behind p block elements.
2. Describe the Preparation Properties of Inter halogen Compounds.
3. Describe the Preparation Properties of Phenols.
4. Discuss the characteristics of gas.
5. Enumerate the types, structure and properties of solids and liquid crystals.

TEXTBOOK(S)

1. Anil J Elias. 2019. The Chemistry of p block elements, Synthesis, Reactions and Applications, First Edition, The Orient Blackswan.
2. Arun Bahl and BS Bahl. 2018. A Textbook of Organic Chemistry, 5th edition, New Delhi, Sultan Chand & Co.
3. Buri BR, Sharma LR and Pathania MS, 2020. Principles of Physical Chemistry, 4th edition, Vishal Publishing Co, Punjab.
4. Kalsi PS. 2017. Stereochemistry conformation and mechanism, 9th edition, New Age International publishers.
5. Satake M. 2003. The Chemistry of p block elements, First Edition, Discovery publishing Pvt, Ltd.

REFERENCE BOOK(S)

1. Glasstone S, Lewis D. Elements of Physical Chemistry, London, MacMillan & Co. Ltd
2. Lee JD. 2006. Concise Inorganic Chemistry, UK, Blackwell science.
3. Morrison RT, Boyd RN. 2018. Organic Chemistry, 6th edition, New York, Allyn & Bacon Ltd.,
4. Nasipuri D. 2020. Stereochemistry of Organic Compounds, Principles and Applications (Fourth edition), New Age international publishers.
5. Peter Atkins & Julio de Paula, 2017. Elements of Physical Chemistry, Seventh edition, Oxford University Press.
6. Puri BR, Sharma LR, Kalia KK. 2020. Principles of Inorganic Chemistry, 3rd edition, Vishal Publishing & Co.

E-RESOURCES

1. <http://jpsw.shikshamandal.org/chemistryofpblockelements>
2. <https://wiki.ubc.ca.chemistryofpblockelements>
3. <https://www.khanacademy.org.stereochemistry>
4. <https://www.topper.com/chemistry/Thegaseousstate>
5. searchworks.stanford.edu/view/4002582

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester :III-CP-III:Organic Analysis(P)

Ins.Hrs./Week: 3

Course Credit:3

CourseCode:23CH306P

Organic Qualitative Analysis and Determination of Physical Constants

Organic Analysis

I Analysis of simple organic compounds

- a) Characterization of functional groups.
- b) Confirmation by preparation of solid derivatives/characteristic color reactions.

(Note:Mono–functional compounds are given for analysis.)

II Determination of physical constants

Determination of boiling/melting point by semimicro method.

Scheme of Evaluation

External:60

Internal: 40

I Organic Analysis	:	40marks
Aromatic/Aliphatic	:	06marks
Saturated/Unsaturated	:	06marks
Special Element	:	08marks
Functional group	:	10marks
Derivatives	:	10marks
II Physical Constant	:	10marks
III Record	:	10marks

COURSEOUTCOME

The student will be able to,

1. Explain the common organic reactions
2. Analyze various organic compounds using documented procedures
3. Classify organic compounds based on functional groups
4. Distinguish there actions of various functional groups
5. Determine physical constants

TEXTBOOK(S)

1. Arthur Vogel. 2010. Qualitative Organic Analysis. (2nd edition), Pearson education, London.
2. Bajarang Bali Dr, Amarnath Misra Dr, Girma. 2016. Practical Instrumental Analysis. (First Edition), Innovative Publication. New Delhi.
3. Bhutani SP. 2009. Practical Organic Chemistry. ANE Books, Chennai.
4. Gnanaprasadam NS and Ramamurthy, G. Organic Chemistry Lab Manual. S. Viswanathan and Co. Pvt. Ltd. Chennai.
5. Hans Thacher Clarke. 2007. A Hand Book of Organic Analysis, (4th Edition), CBS, Chennai.

REFERENCEBOOK(S)

1. Ahluwalia VK, Sunita Dhingra. 2000. Comprehensive Practical Organic Chemistry. University Press.
2. Gopalan R. 2000. Elements of Analytical Chemistry. S. Chand, New Delhi.
3. Satinder Dr, Juneja K, Arankumar Dr. 2021, Practical Chemistry, S. Vinesh & Co
4. Vagish CB. 2018. Organic analysis. Kindle Edition.
5. Vogel's. 1989. Text book of Practical Organic Chemistry, (5th edition), Prentice Hall.

E-RESOURCES

1. edu.rsc.org/resources/qualitative-tests-for-functional-group
2. wwwchem.uwimona.edu.jm/lab-manuals/c10expt25.html
3. pubs.acs.org/doi/10.1021/ac071150w
4. pubs.acs.org/doi/10.1021/acs.jchemed.0c00179
5. www.itseyeris.com/book/comprehensive-practical-chemistry

SEMESTER IV

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY



Semester: IV-CC- IV: General Chemistry-IV

Ins.Hrs./Week:4

Course Credit:4

Course Code:23CH407

UNIT I GENERAL CHARACTERISTICS OF d-BLOCK ELEMENTS(15HOURS)

Transition Elements- Electronic configuration - General periodic trend variable valency, oxidation states, stability of oxidation states, colour, magnetic properties, catalytic properties and tendency to form complexes. Comparative study of transition elements and non transition elements – comparison of II and III transition series with I transition series. Group study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc groups

UNIT II ETHERS, THIO ETHERS AND EPOXIDES (15HOURS)

Nomenclature, isomerism, general methods of preparations, reactions involving cleavage of C-O linkages, alkyl group and ethereal oxygen. Zeisel's method of estimation of methoxy group. Reactions of epoxides with alcohols, ammonia derivatives and LiAlH₄ Thioethers - nomenclature, structure, preparation, properties and uses.

UNIT III THERMODYNAMICS I (15 HOURS)

Terminology – Intensive, extensive variables, state, path functions; isolated, closed and open systems; isothermal, adiabatic, isobaric, isochoric, cyclic, reversible and irreversible processes; First law of thermodynamics – Concept and significance of heat (q), work (w), internal energy (E), enthalpy (H); calculations of q, w, E and H for reversible, irreversible expansion of ideal and real gases under isothermal and adiabatic conditions; relation between heat capacities (C_p & C_v); Joule Thomson effect- inversion temperature.

Thermochemistry - heats of reactions, standard states; types of heats of reactions and their applications; effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions;

UNIT:IV CHEMISTRY OF ORGANO METALLIC COMPOUNDS (15 HOURS)

Introduction–preparation of organo magnesium compounds–physical and chemical Properties– uses– preparation of organo zinc compounds– physical and chemical properties- Uses preparation of organo lithium compounds– physical and chemical properties–uses.

UNIT:V CHEMICAL KINETICS (15HOURS)

Rate of reaction, rate equation, order of reaction, molecularity, Rate laws: rate constants – derivation of rate constants and characteristics for zero, first order, second and third order(equal initial concentration) – half life Period definition-derivation of time for half change with examples. – experimental methods of determination of rate constant of a reaction –volumetry, manometry, polarimetry.

Total Lecture Hours-75

COURSE OUTCOME

The student should be able to,

1. Describe general trends in d block elements and the preparation, properties of Lanthanides and Actinides.
2. Evaluate Ethers Thio ethers and Epoxide compounds preparation & Properties
3. Evaluate Thermodynamics.
4. The stability and reactivity of simple organo metallic compounds.
5. Discuss the characteristics of Chemical Kinetics.

TEXTBOOK(S)

1. Agarwal OP, Dr.2017. Alcohols, Phenols & Ethers, Third edition, Disha publication.
2. Helen C Aspinall. 2020. Chemistry of f block elements (First edition), OUP Oxford,
3. Mark J Winter. 2015. D-Block Chemistry, (second edition), OUP Oxford
4. Green MLH. 2013. Organometallic Compounds, vol 2, Springer
5. Madelung. 2004. Introduction to Solid State Theory, First edition, Springer India PVT Ltd.,
6. Mukesh Patel, Parimal Chatrabuji. 2018. Fundamentals of Chemical Kinetics, volume 1, create space

REFERENCE BOOK(S)

1. Bahl BS, Arun Bahl, 2016. A Text Book of Organic Chemistry, 22nd edition, Sultan Chand & Co., New Delhi,
2. Glassstone S, Lewis D. Elements of Physical Chemistry, London, Mac Milan & Co.
3. Lee JD. 2006. Concise Inorganic Chemistry, UK, Blackwell Science
4. Morrison RT, Boyd RN. 2018. Organic Chemistry. 6th edition, New York, Allyn & Bacon Ltd.,
5. Puri BR, Sharma LR, Kalia KK. 2020. Principles of Inorganic Chemistry, 33rd edition, Vishal Publishing & Co.,

E-RESOURCES

1. https://www.onlinelibrary.wiley.com/doi/abs/10.1002/aenm.202000280d7_f_block_elements
2. <https://pubs.acs.org/doi/10.1021/jo00392a011organometalliccompounds>
3. <https://www.coursehero.com/file/92206671/ch11-alcohols-phenols-etherspptx/>
4. <https://pubs.acs.org/doi/10.1021/ja02254a006solidstate>
5. <https://learn.careers360.com/chemistry/chemical-kinetics-chapter/>

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDRAMKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY



Semester: IV-CP-IV: Semi micro Analysis(P)

Ins.Hrs./Week: 3

Course Credit:3

Course Code:23CH408P

Semi micro Inorganic Qualitative Analysis

Analysis of a mixture containing two cations and two anions of which one will be an interfering acid radical. Semi micro methods using the conventional scheme with hydrogen sulphide may be adopted.

Cations to be studied:

Lead, copper, bismuth, cadmium, iron, aluminium, zinc, manganese, cobalt, nickel, barium, calcium, strontium, magnesium and ammonium.

Anions to be studied:

Carbonate, Sulphide, Sulphate, nitrate, chloride, bromide, fluoride, borate, oxalate and phosphate.

SCHEME OF EVALUATION

Marks Distribution for external:	Practical	- 50marks
	: Record	- 10 marks
	: Total	- 60 marks
4 radicals correct with suitable tests:		- 50marks
3 radicals correct with suitable tests:		- 40marks
2 radicals correct with suitable tests :		- 30marks
1 radical correct with suitable tests:		- 15marks
Spotting		- 05 marks

COURSE OUTCOME

The student will be able to,

1. Gained the theoretical as well as practical knowledge of handling chemicals.
2. Analyze and detect various cations and anions in the presence of each other in a given mixture qualitatively.
3. Explain the basic analytical knowledge and group separation of elements.
4. Difference between the interfering and non-interfering anions.
5. Understand to remove interfering anion and group separation of various cations.

TEXT BOOK(S)

1. AmarnathMishra.2018. Qualitative Inorganic Analysis ,Bharati Bhawan(P& D).
2. RakeshSharmaL,Dr.2021.PracticalInorganicChemistry.EvincePublishing.
3. Shikha GulatiJL,Sharma,Shagun Manocha.2017.Practical Inorganic Chemistry.CBS PublisherPvtLtd.
4. Svehla G, Sivasankar B. 2012. Qualitative Inorganic Analysis. 7th Ed, Pearson Education,India.
5. Vogel,2000.Text Book of Quantitative Inorganic Analysis.6 th Ed,Longman,NewDelhi.

REFERENCEBOOK(S)

1. George MarrBW, Rachel. 1972. Practical Inorganic Chemistry. Van Nostr and Reinhold Company.
2. GurdeepRaj. 2013. Advanced Practical Inorganic Chemistry. Krishna Prakashan Media(P)Ltd.
3. RamanujamVV.1988.InorganicSemimicroQualitative Analysis.3rdEd,National Pubs,London.
4. SoniaRatnani,SwatiAgarwal,SujeetMishra,2020.PracticalChemistry,IstEd,McGr aw Hill Education Private Ltd.
5. SvehlaG.1987.TextBookofMacro and Semimicro Qualitative InorganicAnalysis.5thEd,Longman group Ltd, London.

E-RESOURCES

1. https://www.researchgate.net/publication/283476036_inorganic_qualitative_analysis_a_greener_approach
2. <https://www.readallbooks.org/book/vogels-qualitative-inorganic-analysis-7th-edition/>
3. https://www.academia.edu/14685017/vogels_textbook_of_qualitative_inorganic_analysis
4. <https://kresnadipayana.files.wordpress.com/2018/10/macro-and-semimicro-qualitative-inorganic-analysis-5ed-vogel.pdf>
5. <https://bookflow.in/books/vogels-qualitative-inorganic-analysis/>

**

SKILL BASED ELECTIVE

SBE - I

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester :IV-SBE-I:Chemistry of Milk and Milk Products

Ins.Hrs./Week:2

Course Credit:2

Course Code:22SBECH1

UNIT:I MILK

(7hours)

Milk: Definition – General composition of milk – Physical properties of milk – colour, odour, acidity–natural and developed, specific gravity–Recknagel effect, viscosity and conductivity, factors affecting the gross composition of milk, Organic milk products, Legal and BIS standard of milk and milk products, Sanitation of milk plant.

UNIT:II CARBOHYDRATES & VITAMINS

(7hours)

Milk carbohydrate – Lactose its structure, solubility, hydrolysis, oxidation and reduction, estimation of lactose in milk.

Milk vitamins–water and fat soluble vitamins, effect of heat and light on vitamins .Ash and mineral matters in milk.

UNIT – III LIPIDS

(6hours)

Butter: Definition- %composition–manufacture–Estimation of fat, acidity, salt and moisture content–Desibutter

Ghee: Major constituents –common adulterants added to ghee and their detection–Rancidity definition types (hydrolytic,oxidative and ketonic) prevention and antioxidants and syner gist (natural and synthetic)–Measurements.

UNIT- IV FERMENTATION

(5hours)

Fermented Milk products: Fermentation of milk – definition, conditions, cultured milk – definition of culture – examples, conditions, types – cultured cream – cultured butter milk – Bulgarian milk -acidophilus milk –yogurt.Reacteriophage–definition and its function.

UNIT-V MILK POWDER

(5hours)

Milk Powder: Definition–need for making powder–drying process–spray drying, drum drying, jet drying and foam drying – principles involved in each. Manufacture of whole milk powder by spray drying process–keeping quality of milk powder.

Total Lecture Hours-30

COURSEOUTCOME

The student will be able to,

1. Appraise the properties of milk and detection of adulteration and preservatives
2. Classify the milk lipids, proteins, carbohydrates, vitamins and its properties
3. Categorize and summarize the milk products and its measurements
4. Describe the milk products and its composition
5. Understand the methods of manufacture of milk powder

TEXTBOOK(S)

1. Ashok Kumar Agrawal, Megh Goyal R. 2017, Processing Technologies for Milk and Milk Products, 2nd edition, Apple Academic Press.
2. Mahindru SN. 2009. Milk and Milk Products, APH Publishing Corporation.
3. Patange DD and Kamble DK. 2018. A Text Book on Milk and Milk Products 1st edition, Jaya Publishing House
4. Rajagopal S, Roy SK. 2014. Milk and Milk Products Technology 1st edition, Vikas Publication House Pvt Ltd.
5. Young W Park. 2013. Milk and Dairy Products in Human Nutrition, 2nd edition, Person Education Ltd, New Delhi.

REFERENCEBOOK(S)

1. Alan H Varnam, Jane P Sutherland, 1994. Milk and Milk Products, Technology, Chemistry and Microbiology, 1st edition, Springer, Boston, MA
2. Fox PF, Uniavke T. 2015. Dairy Chemistry and Biochemistry, 2nd edition, Springer International Publishing Switzerland.
3. Griffiths, 2010. Improving the Safety and Quality of Milk 1st edition, Woodhead Publishing.
4. Ralph Early. 1998. The Technology of Dairy Products 2nd edition, Blackie Academic & Professional, London.
5. Singh, Shivashraya. 2014. Dairy Technology Milk And Milk Processing volume 1, New India Publishing Agency, New Delhi.

E-RESOURCES

1. <https://dairyprocessinghandbook.tetrapak.com>
2. <https://www.compoundchem.com>
3. <https://pubs.acs.org>
4. <http://ecoursesonline.iasri.res.in>
5. <https://www.routledge.com>

NON MAJOR ELECTIVE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY



Semester: III -NME-I:Agricultural Chemistry

Ins.Hrs./Week:2 Course Credit:2 CourseCode:23NMECH31

UNIT- I: Origin of Soil (4Hours)

Origin of soils, their properties, acid, alkali and saline soils – diagnosis – remediation of acid and salt affected soils–methods of reclamation and after care.

UNITII Chemistry Aspects of Soil (7Hours)

Soil testing – concept, objectives and basis – soil sampling, pH testing, Mineral testing – Copper, Zinc and Nickel, tools, collection processing, dispatch of soil samples – soil organic matter–its decomposition.

UNITIII Plant Nutrients (7Hours)

Plant nutrients – macro and micro nutrients – their role in plant growth – sources - forms of nutrient absorbed by plants – factors affecting nutrient absorption - deficiency symptoms in plants–corrective measures– chemicals used for correcting nutritional deficiencies–nutrient requirement of crops– their availability fixation and release of nutrients.

UNITIV Fertilizers (5Hours)

Fertilizers – classification of NPK fertilizers – sources - natural and synthetic – straight – complex–liquid fertilizers, their properties, use and relative efficiency secondary and micro nutrient fertilizers–mixed fertilizers, nitrogen fixation, nitrogen cycle.

UNITV Pesticides (7Hours)

Pesticides: definition – Classification – organic and inorganic pesticides – mechanism of action – characteristics safe handling of pesticides – impact of pesticides on soil, plants and environment, DDT, BHC.

Total Lecture Hours-30

COURSE OUTCOME

The student will be able to ,

1. Discuss the diagnostic methods of soil
2. Understand the different processing of soil.
3. Illustrate the significance of plant nutrients
4. Study the classification, preparation and utilization of fertilizers
5. Gain knowledge of the classification, mode of action of pesticides

TEXTBOOK(S)

1. [Ajay Singh](#) 2018. Agricultural Chemistry, Pushpanjali Prakashan publishers.
2. Biswas TD, Mukherjee SK. 1987. Text Book of Soil Science, Tata McGraw-Hill Publishing Company.
3. Buchel KH. 1983. Chemistry of Pesticides, John Wiley & Sons New York.
4. Sree Ramulu V
S. 1979. Chemistry of Insecticides and Fungicides, Oxford and IBH Publishing Co., New Delhi.
5. Tisdale SL, Nelson WL, Beaton JD. 1990. Soil Fertility and Fertilizers, Macmillan Pub Co New York.

REFERENCE BOOK(S)

1. Daji A. J. 1970. A Text Book of Soil Science, Asia Publishing House, Madras.
2. Hesse P. R. 1971. A Text Book of Soil Chemical Analysis, John Murray, New York.
3. Margarita Stoytcheva and Roumen Zlatev 2013. Agricultural Chemistry, Intech Open
4. Parameshwar Hegde H. 2009. Textbook of Agro-Chemistry, Discovery Publishing.
5. [Thomas Anderson](#) 2008. Elements of Agricultural Chemistry, Biblio Life Publisher.

E-RE SOURCES

1. <http://www.freebookcentre.net> > Chemistry > Agricultural..
2. <http://www.freebookcentre.net> > Elements-of-Agricultural chemistry.
3. <https://www.amazon.in> > Text-Book-Agro-Chemistry-H...
4. <http://ebooksgo.org> > free-agricultural-chemistry-ebook...
5. <https://www.researchgate.net> > publication > 27588583...
6. <https://www.forgottenbooks.com> > books > Organic Agr...
7. <https://www.intechopen.com> > books > agricultural-che...

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: IV-NME-II: Health Chemistry

Ins.Hrs./Week:2

Course Credit:2

Course Code:22NMECH42

UNIT I Health

(4Hours)

Definition: Food, Food Pyramid - Health-Hygiene- mal, under and over nutrition, their causes and remedies, sanitation.

UNITII Drugs

(7Hours)

Drugs- Types of drugs– depressant– Barbiturtes, anticonvulsant–Carbamazepine, narcotics – morphine, antipyretics – Acetyl salicylic acid (Aspirin), antibiotics - Penicillins, antiseptics– Chlorhexidine, (OnlyApplications).

UNIT III Body Fluids

(7Hours)

Blood volume, groups, coagulation, blood pressure, anaemia, blood sugar, haemoglobin. Chemistry of urine.

UNITIV Enzymes and Hormones

(6Hours)

Types of enzymes and enzyme action - Characters of hormones action - examples of essential hormones –insulin, melatonin, estrogen, testosterone ,cortisol.

UNITV Common Diseases (6Hours)

Common diseases - Jaundice, fever, night blindness, ulcer, and diabetes - their causes and remedies

Total Lecture Hours-30

COURSE OUTCOME

The student will be able to,

1. Understand the fundamentals of health chemistry
2. Predict the classification and utilization of drugs
3. Study the significance of body fluids and their related diseases
4. Apply the types and mode of action of enzymes and hormones
5. Acquire knowledge about causes and remedies for common diseases

TEXTBOOK(S)

1. Ashutosh Kar. 1993. Medicinal Chemistry, Wiley Easterns Limited, New Delhi.
2. [Ashutosh Kar](#). 2012. Pharmaceutical Drug Analysis, Newage international publishers.
3. Deb A.C 2017, Fundamentals of Biochemistry, New Central Book Agency, Calcutta, 4th edition.
4. [Jain S](#). 2008. A Handbook of Common Diseases: Causes & Cure, Vijay Goel Publishers
5. [Mallick P.N.](#) 2008. Some Common Diseases and Their Treatment, Vora Medical Publications.
6. Satake M. and Mido Y. 2003. Chemistry for Health Science, Discovery Publishing House, New Delhi.
7. Saurabh Bhatia. 2018. Introduction to enzymes and their applications, IOP Publishing Ltd.

REFERENCE BOOK(S)

1. Alagarsamy. 2013. Text book of Medicinal Chemistry Vol II, 2nd Ed, Elsevier Science
2. Alex V Ramani, 2015. Food Chemistry, MJP Publishers, Chennai, Kindle edition
3. Jayashree Ghosh, 1999. A Text Book of Pharmaceutical Chemistry, S. Chand and Co. Ltd.
4. [Munendra Mohan Varshney Asif Husain](#) 2020. A Text book of Medicinal Chemistry, Dream tech Press.
5. [Surendra N Pandeya](#) 2009. A Textbook of Medicinal Chemistry Synthetic & Biochemical Approach Volume 2, S.G. Publisher.

E-RESOURCES

1. [https://www.amazon.in/Healthy-Chemistry-Optimal-H.](https://www.amazon.in/Healthy-Chemistry-Optimal-H)
2. <https://www.amazon.in/Fundamentals-Biochemistry-A...>
3. <https://www.amazon.in/Handbook-Common-Diseases-...>
4. [https://www.flipkart.com/fundamentals-biochemistry-.](https://www.flipkart.com/fundamentals-biochemistry-)
5. <https://www.amazon.in/Textbook-Pharmaceutical-Che>
6. [https://www.amazon.in/Food-Chemistry-Alex-V-Ram.](https://www.amazon.in/Food-Chemistry-Alex-V-Ram)

SEMESTERV

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester :V-CC-V:Inorganic Chemistry

Ins.Hrs./Week:5

Course Credit:5 Course Code:R23CH509

UNIT I Coordination Compounds–I

(16Hours)

Introduction – Types of ligands: unidentate and polydentate ligands, chelating ligands and chelates–IUPAC nomenclature of coordination compounds. Isomerism in coordination compounds : Structural isomerism, hydrate isomerism, coordination isomerism, ionization isomerism, linkage isomerism, coordination position isomerism. Stereo isomerism: Geometrical isomerism of four and six coordinate complexes, optical isomerism of four and six coordinate complexes, Werner and Sidgwick theories, methods of detecting complex formation.

UNIT II Coordination Compounds–II

(16Hours)

Theories of coordination compounds : Valence bond theory, limitations of valence bond theory, crystal field theory – splitting of d orbitals in octahedral, tetrahedral and square planar fields, CFSE, factors affecting CFSE, color, geometry and magnetic properties of coordination compounds, Jahn–Teller distortion (an elementary idea).

Molecular orbital theory: Molecular orbital diagram for $[\text{Co}(\text{NH}_3)_6]^{3+}$. Ligand field theory. (An elementary treatment only).

UNIT III Coordination Chemistry–II

(15 Hours)

Labile and inert complexes, stability of coordination compounds – thermodynamic and kinetic stability, relationship between stepwise formation constant and overall formation constant, factor affecting the stability of complexes.

Unimolecular and bio molecular nucleophilic substitution reactions in octahedral and square planar complexes, trans effect – theories of trans effect and applications.

UNIT IV Carbonyls and Binary Metallic Compounds

(12 Hours)

Metal carbonyls : Mono and binuclear carbonyls of Ni, Fe, Cr, Co and Mn – preparation, structure, reactions bonding and uses. Binary metallic compounds : borides, carbides and nitrides – classification, preparation, properties and uses.

UNIT V Nitrosyl Compounds and Magnetic Properties

(17Hours)

Nitrosyl compounds: Classification – nitrosyl chloride and sodium nitro prusside – preparation, properties and structure. Magnetic properties – meaning of the terms – magnetic susceptibility – magnetic moment – type of magnetism – Gouy balance – applications of magnetic properties. Dipole moment – determination, application in the study of simple inorganic molecules.

Total Lecture Hours-75

COURSE OUTCOME

The students are able to,

1. Discuss how ligand substitution reaction takes place in octahedral and square – planar, trans effect and trans influence and how trans effect is applicable in synthesis of different metal complexes.
2. Predict the geometries of simple molecules.
3. Discuss thermodynamic and Kinetic stability of Complexes.
4. Understand the classification, structure, and biological functions of different type of Coenzymes.
5. Explain how metal ions take part in biological system and their concentration effect and physiological effect on biological system.

TEXTBOOK(S)

1. Drago RS. 1992. Physical Methods in Chemistry, 3rd Ed., W.B. Saunders Company, London,
2. Gopalan R. 2008. Concise Coordination Chemistry, First edition, Vikas Publication House Pvt Ltd.
3. Huheey JE, Keiter EA, Keiter RL. 1993. Inorganic Chemistry Principles of Structure and Reactivity, 4th Ed., Harper Collins College Publishers, New York,
4. Kazuo Nakamoto. 2019. Infrared and Raman Spectra of Inorganic and Coordination Compounds, Part A and B, 6th Ed., John-Wiley and Sons, Inc. New York.
5. Sutton D. 1968. Electronic Spectra of Transition Metal Complexes, Mc Graw Hill, Australia.

REFERENCE BOOK(S)

1. Cotton FA, Wilkinson G. 1972. Inorganic Chemistry A Comprehensive Text, 3rd Ed., Interscience Publishers, New York.
2. Crabtree RH. 2014. The Organometallic Chemistry of the Transition Metals, 6th Ed., John-Wiley and Sons Inc., New York.
3. Ebsworth EA V. 1987. Structural Methods in Inorganic Chemistry, 3rd Ed., Great Britain, ELBS.
4. Housecroft CE, Sharpe AG, 2012, Inorganic Chemistry 4th Ed., Pearson Education Limited, Essex,
5. Lee JD, 1998. Concise Inorganic Chemistry, 6th Ed., ELBS, London,
6. Lewis J, Wilkins RG, 1960. Modern Coordination Chemistry, Interscience Publishers, Inc., New York,.
7. Miessler GL, Fischer PJ, Tarr DA, 2014, Inorganic Chemistry, 5th Ed., Pearson Education, Inc., New York,.

E-RESOURCES

1. <https://www.britannica.com/science/coordination-compound>
2. <https://pubs.acs.org/doi/10.1021/ic50033a014>
3. <https://pubs.acs.org/doi/10.1021/cr0000751>
4. <https://pubs.acs.org/doi/10.1021/om950697a>
5. <https://www.cambridge.org/core/books/magnetism-and-magnetic-materials/ad3557e2d4538caa8488a8c1057313bc>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: V-CC-VI: Organic Chemistry-I

Ins.Hrs./Week:6

Course Credit:6 Course Code:R23CH510

UNIT I Chemistry of Carbonyl Compounds (16Hours)

Nomenclature-structure of carbonyl compounds-chemical properties-nucleophilic addition mechanism at carbonyl group (eg:HCN,ROH,RNH₂)- acidity of alpha hydrogen -
– keto - enol Tautomerism (proof for the two forms). Reduction and oxidation reactions of carbonyl compounds – para formaldehyde, meta formaldehyde - uses of aliphatic carbonyl compound-Claisen condensation–Aldol condensation–Robinson annulation

UNIT II Chemistry of Carboxylic Acids (16Hours)

Carboxylic acid-Nomenclature-Mono carboxylic acid ,Dicarboxylic acid –Preparation, physical and chemical properties & uses.Preparation, properties and uses of acid derivatives: acid chloride, anhydrides, esters, amides-chemistry of compounds containing active methylene group–synthesis and synthetic applications of acetoacetic ester and malonic ester.

UNIT III Chemistry of Nitrogen Compounds (15Hours)

Amines – effect of substituents on basicity of aliphatic and aromatic amines - Reactions of aminocompounds(primary,secondary,tertiary and quaternary amine compounds)-Diazonium compounds-Sandmeyer reactions-preparation and synthetic applications of diazomethane,benzene diazonium chloride and diazo acetic ester.

UNIT IV Chemistry of Heterocyclic Compounds (12Hours)

Introduction–nomenclature of heterocyclic compounds having not more than two hetero atoms such as oxygen, nitrogen and sulfur - structure, synthesis and properties of furan,pyrrole, thiophene. Pyridine . -synthesis and reactions of quinoline, isoquinoline and indole with special reference to Skraup, Fischer Napleralloski and Fischer - indole syntheses.

UNIT V Dyes (16Hours)

Dyes - color and constitution – chromophore - auxochrome - classification according to application and structure - preparation and uses of - methyl orange, fluorescein, Alizarin,Indigo and malachite green dyes. Anthraquinone dyes – alizarin. Phthalein dyes – fluorescein. Sulphonic acid and derivatives - preparation and properties of benzene sulphonic acid. Saccharin, chloramine – T and sulphonamides.

Total Lecture Hours-75

COURSE OUTCOME

The students are able to,

1. Recognise how different compounds are prepared by their actions of carbonyl moiety.
2. Understand the synthesis of carboxylic acids and its derivatives from different substrates.
3. Describe the properties, preparation, and applications of the most important inorganic nitrogen compounds.
4. Understand the structures of heterocyclic aromatic organic compounds.
5. Gain knowledge about the synthesis of dyes and an account of impact of textile on environment.

TEXT BOOK(S)

1. Bahl BS, Bahl A. 2010, Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.,
2. Finar IL. 2009. Organic Chemistry Vol. II, 7th Ed., Pearson Education Ltd, New Delhi,
3. March J, Smith MB March's. 2013. Advanced Organic Chemistry Reactions, Mechanisms, and Structure, 7th Ed., Wiley, New York.
4. Morrison RT, Boyd RN. 2018. Organic Chemistry, 6th edition, New York, Allyn & Bacon Ltd.,
5. Panico WH, Powell L, Jean C, Richer, 1993. A Guide of IUPAC Nomenclature of Organic compounds.

REFERENCE BOOK(S)

1. Arun Bahl, Bahl BS. 2018. A Text book of Organic Chemistry, 5th edition, New Delhi, Sultan Chand & Co.
2. Finar IL. 1996. Organic Chemistry, Vol 1 & 2, 6th edition, England, Addison Wesley Longman Ltd.
3. Morrison RT, Boyd RN, Bhattacharjee SK. 2014. Organic Chemistry 7th edition, Pearson India,
4. Pine SH. 1987. Organic Chemistry, 5th edition. New Delhi, McGraw – Hill International Book Company.
5. Seyhan N Ege. 2005. Organic Chemistry, 5th edition, New York, Houghton Mifflin Co.

E-RESOURCES

1. <https://www.slideshare.net/mtaherhamdani/eg101-sen-Int008jan10>
2. https://www.ch.ic.ac.uk/widdowson/teach_files/nitrogen/dw1.html.
3. <https://en.unipr.it/ugov/degrecourse/171553>
4. <https://catalogue.nla.gov.au/record/393582>
5. <http://sustainabilityforschools.org/assets/chemistry-guide-for-teachers.pdf>

SENGAMALATHAYAARE EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: V-CC-VII: Physical Chemistry–I

Ins.Hrs./Week:6

Course Credit:6

Course Code:R23CH511

UNIT- I: Photochemistry and its Applications (16Hours)

Consequences of light absorptions-Jablonski diagram-radiative and non-radiative transitions. Lambert's law, Beer's law and Stark law of photochemical equivalence, quantum efficiency. Photochemical reaction-Comparison between thermal and photochemical reactions. Photosensitization and quenching. Fluorescence, Phosphorescence Chemiluminescence and Bioluminescence. Laser and its applications.

UNIT–II: Thermodynamics-I (16 Hours)

Definitions- systems and surroundings -isolated, closed and open system – state of the system-intensive and extensive variables. Thermodynamic processes-reversible and irreversible and Isothermal and adiabatic processes-state and path function. Work of expansion at constant pressure and at constant volume. First law of thermodynamics–statement-definition of internal energy(E), enthalpy (H) and heat capacity. Relationship between C_p and C_v . Calculation of w , q , dE and dH for expansion and real gases under isothermal and adiabatic conditions of reversible and irreversible processes. Thermochemistry –relationship between enthalpy of reaction at constant volume (q_v) and at constant pressure (q_p) – temperature dependence of heat reaction

UNIT–III: Thermodynamics-II (15Hours)

Second law of thermodynamics- need for the law-different statement of the law - Carnot's Cycle and efficiency of heat engine-Carnot's theorem-thermodynamic scale of temperature. Concept of entropy -definition and physical significance of entropy –entropy as a function of P , V and T – entropy changes during phase changes – entropy of mixing –entropy criterion for spontaneous and equilibrium processes in isolated system. Gibbs free energy(G) and Helmholtz free energy (A) – variation of A and G with P , V and T - Gibbs –Helmholtz equation and its applications. Thermodynamic equation of state, Maxwell's relations - ΔA and ΔG criteria for spontaneity and equilibrium.

UNIT-IV: Thermodynamics-III (12Hours)

Equilibrium constant and free energy change- thermodynamic derivation of law of mass action-equilibrium constants in terms of pressure and concentration– NH_3 , PCl_5 and $CaCO_3$. Thermodynamic interpretation of Le-chatlier's principle (Concentration, temperature, Pressure and addition of inert gases.)

Systems Variable composition – Partial molar quantities – chemical potential - Variation of chemical potential with T , P and X (Mole fraction) - Gibbs Duhem equation. Van't Hoff isochore. Clapeyron equation and Clausius – Clapeyron equation – applications. Third

law of thermodynamics- Nernst heat theorem. Statement of III law and concept of residual entropy-evaluation of absolute entropy from heat capacity data.

UNIT–V:Solutions and Phase Changes

(17Hours)

Raoult's law, Henry's law, Ideal and non –Ideal solutions, Completely miscible liquid systems – benzene and toluene. Partially miscible liquids – Phenol - Water, Triethyl amine - Water and Nicotine- Water systems. Lower and upper CSTs – effect of impurities on CST. Completely immiscible liquids. Definition of terms in the phase rule – derivation and application to one component system-water and sulphur system – supercooling, sublimation.

Two Component systems – solid liquid equilibria, simple eutectic (Lead-silver, Bi - Cd), desilverisation of lead. Compound formation with congruent melting point (Mg – Zn) and incongruent melting point (Na-K)

Total Lecture Hours-75

COURSE OUTCOME

The students are able to,

1. Describe Principles of Photochemistry Reactions.
2. Understand the basic concept of Thermodynamics.
3. Discuss various Theorem, Laws of Thermodynamics.
4. Understand the Various its theorem, Equations and application of theorem.
5. Understand the concept of Phase Rule and explain the different Component Systems.

TEXT BOOK(S)

1. Arun Bahl, B.S. Bahland G.D. Tuli, 2014. Essentials of Physical Chemistry, New Delhi. S. Chand & Company Pvt. Ltd,
2. Grudeepraj. 2020. Advanced Physical Chemistry. Krishna Prakashan Media, Meerut, UP.
3. Nicholas J. Turro, Ramamoorthy V, Scaiano JC. 2019. Principles of molecular Spectroscopy. Viva Books Private Ltd, Chennai.
4. Rajput R.K. 2017. A Textbook of Engineering thermodynamics (5th edition), Laxmi publications, New Delhi.
5. Rastogi R.P, Misra R.R. 2018. An Introduction to Chemical Thermodynamics. 6th revised Ed, Vikas Publishing House Private Ltd, Noida, UP.

REFERENCE BOOK(S)

1. Atkins P.W. 1994. Physical Chemistry, 5th edition, Oxford University Press, India
2. Glassstone S, Lewis D. Elements of Physical Chemistry, Mac Millan & Co Ltd London.
3. Puri B.R, Sharma L.R, Pathania M.S. 2013, Principles of Physical Chemistry, 35th edition, Shoban Lal Nagin Chand and Co, New Delhi.
4. Rajaram J, Kuriacose J.C. 1986. Thermodynamics for students of chemistry, Lal Nagin Chand, New Delhi.
5. Samuel Glasstone, 1974. Thermodynamics for Chemists, 3rd edition, East-West Publishers, America.
6. Sangaranarayanan M.V, Mahadevan V. 2011. Text Book of Physical Chemistry, 2nd Edition, Hyderabad, Universities Press, India.

E-RESOURCES

1. <https://www.springer.com/gp/book/9783319899718>
2. <https://www.springer.com/gp/book/9789027716989>
3. <https://www.unf.edu/~michael.lufaso/chem2045/Chapter5.pdf>
4. <https://www.freebookcentre.net/chemistry-books-download/Thermodynamics-and-chemistry-second-edition.html>

5. https://www.researchgate.net/publication/265602607_Phase_Rule_CHAPTER-6_PHASE_RULE

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAL, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: V-CP-V: Physical Chemistry Practical

Ins.Hrs./Week: 3

Course Credit: 3 Course Code: R23CH512P

List of Experiments:

1. Critical Solution Temperature
2. Effect of impurity on Critical Solution Temperature
3. Transition Temperature
4. Rast Method
5. Phase Diagram (Simple eutectic system)
6. Kinetics of Ester Hydrolysis
7. Partition Co-efficient of iodine between water and carbon tetra chloride.
8. Determination of cell constant
9. Conductometric Acid-Base Titration
10. Potentiometric Redox Titration

Scheme of evaluation:

Internal:	40marks	Ext .Evaluation:	60 marks
Practical		-	50marks
Record		-	10marks
Practical(Experiment and Calculation)		-	40 marks
Procedure Writing with formula		-	10marks

COURSE OUTCOME

The students are able to,

1. Understand the molecular weight, TT, CST and rate constant are determined.
2. Understand the determination of Partition Coefficient of iodine between water and carbon tetra chloride.
3. Observe the conductometric titration and potentiometric titrations which can be determined.
4. Design and carry out scientific experiments as well as accurately record and analyze
5. Solving problems, critical thinking and analytical reasoning.

TEXT BOOK(S)

1. Abbot D. 1965. Practical Physical Chemistry Littlehampton Bookservice Pvt Ltd.
2. Gupta, Renu. 2017. Practical Physical Chemistry Newage International Publisher, Chennai.
3. Moahmad Abdelfattah. 2018. Practical Physical Chemistry Lambert Academic Publishing,
4. Sindhu PS. 2009. Practicals in Physical Chemistry Laxmi Publications, Chennai.
5. Viswanathan B, Raghavan PS. 2012. Practical Physical Chemistry Viva books, Chennai.

REFERENCE BOOK(S)

1. Alexander Findlay. 2016. Practical Physical Chemistry, Wentworth Press. London.
2. Findlay's 1985. Practical Physical Chemistry, Revised and edited by B.P. Levitt 9th ed., Longman, London,
3. Gurtur JN. Kapoor R. Advanced Experimental Chemistry, Vol. I. Chand & Co., Ltd, New Delhi.
4. Saroj Kr Maity, Naba KR Ghosh. 2012. Physical Chemistry Practical, New central book Agency.
5. Yadav JB. 2021. Advanced Practical Physical Chemistry, 38th edn. Goel Publishing House, Krishna Pakashan Media Ltd.,

E-RESOURCES

1. <https://bookboon.com/en/chemistry-ebooks>
2. <http://www.freebookcentre.net/Chemistry/ElectroChemistry-Books-Download.html>
3. <http://www.tndte.gov.in/site/e-text-book/>
4. <http://www.freebookcentre.net/Chemistry/Chemistry-Books-Online.html>
5. <https://bookboon.com/en/chemistry-ebooks>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

DEPARTMENT OF CHEMISTRY

Semester: V-MBE-I: Material and Nano Chemistry

Ins.Hrs./Week:4

Course Credit:3 Course Code:R23MBECH1:2

UNIT- I: Ionic Conductivity and Solid Electrolytes (12Hours)

Types of ionic crystals – alkali halides – silver chloride – alkali earth fluorides – simple stoichiometric oxides. Types of ionic conductors – halide ion conductors – oxide ion conductors – solid electrolytes – application of solid electrolytes. Electrochemical cell – principles – batteries, sensors and fuel cells – Inorganic solids – colors, magnetic and optic properties.

UNIT–II: Magnetic Materials (12Hours)

Ferrites : Preparations and their applications in microwaves – floppy disc – magnetic memory and applications. Insulating materials – classification on the basis of temperature – polymer insulating materials and ceramic insulating materials. Ferroelectric materials: examples – application of ferroelectrics.

UNIT–III: Modern Engineering Materials (16Hours)

Metallic glasses – introduction – composition, properties and applications. Shape memory alloys: introduction – examples – applications of SMA – advantages and disadvantages. Biomaterials: Introduction – metals and alloys in biomaterials – ceramic biomaterials, composite biomaterials – polymer biomaterials.

UNIT- IV: Nano phase Materials (12Hours)

Introduction - techniques for synthesis of nanophase materials – sol-gel synthesis, electrodeposition – inert gas condensation – mechanical alloying and applications of nanophase materials. Composite materials: introduction – types.

UNIT–V: Nano Technology (12Hours)

Introduction – importance – various stages of nanotechnology – nanotube technology – nanoparticles – fullerenes – nano dendrimers – nano pore channels, fibers and scaffolds – CVD diamond technology – FCVA technology and its applications – nano imaging techniques.

Total Lecture Hours-60

COURSE OUTCOME

The students are able to,

1. Gain knowledge the types of ionic crystals and defects in solids.
2. Understand the different kinds of magnetic properties and its applications.
3. Understand the concepts of metals and alloys in Biomaterials.
4. Analysis the techniques of Nano phase materials.
5. Discuss about the uses of nano technology.

TEXT BOOK(S)

1. Geoffrey A, Ozin Andre C, Arsenault. 2006. A Chemical Approach to Nanomaterials, 1st edition, RSC publications.
2. Kenneth Klabunde, Gleb Sergeev. 2013. Text Book of Nanochemistry, 2nd Edition, Elsevier.
3. Nabok A. 2005. Organic and Inorganic Nanostructures, 1st edition, Artech House, Boston.
4. Rao CN, Cheetham AK. 2004. The Chemistry of Nanomaterials 1st edition, Wiley publications.
5. Rietman EA. 2001. Molecular Engineering of Nanosystems, 1st edition, Springer - Verlag, New York.

REFERENCE BOOK(S)

1. Anthony R West. 1989. Solid State chemistry and its applications, 1st edition, John Wiley and Sons Publication.
2. Fujita H. 2003. Micromachines as Tools in Nanotechnology, 1st edition, Springer - Verlag, Berlin,
3. Kenneth J, Klabunde. 2003. Nanoscale Materials in Chemistry, 1st edition A. John Wiley and Sons, Inc. Publications.
4. Pradeep T. 2007. Nano The Essentials in Understanding Nanoscience and Nanotechnology; 1st Ed., Tata McGraw Hill, New York.
5. Ragavan VR. 2001. Materials Science and Engineering, Prentice Hall (India) LTD,

E-RESOURCES

1. <https://onlinelibrary.wiley.com/doi/book/10.1002/352760247X>
2. <https://web.pdx.edu/~pmoeck/phy381/intro-nanotech.pdf>
3. <http://web.pdx.edu/~pmoeck/phy381/workbook%20nanoscience.pdf>
4. <http://seemanlab4.chem.nyu.edu/>
5. <http://pubs.acs.org/journals/nalefd/index.html>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI-614016

(For the Candidates admitted in the academic year 2022– 2023)

DEPARTMENT OF CHEMISTRY

Semester:V-MBE-I:Analytical Chemistry

Ins.Hrs./Week:4

Course Credit:3

Course Code:R23MBECH1:1

UNIT- I: Laboratory Hygiene and Safety

(12 Hours)

Storage and handling of chemicals - corrosion, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple first aid procedures for accidents involving acids, alkalines, bromine burn and cut by glass. Precautions to avoid poisoning-treatment for specific poisons, safe limits- laboratory safety measures. Waste disposal - fume disposal- precautions for avoiding accidents.

UNIT-II:Data Analysis

(12Hours)

The mean - significant numbers, the median- precision, accuracy- confidence limits, standard deviation. Errors -methods for improving accuracy - presentation of tabulated data – scatter diagram-method of least squares-SI units. Separation techniques: Precipitation- solvent extraction- chromatography- types- column chromatography- thin layer chromatography. Paper chromatography – paper electrophoresis – Ion exchange chromatography – Gas liquid chromatography.

UNIT-III: Gravimetric Analysis and Thermo Analytical Methods (12Hours)

Gravimetric analysis–principles–methods of gravimetric analysis–requirements of gravimetric analysis – precipitation – theories of precipitation. Types of precipitation – co-precipitation, post precipitation and precipitation from homogeneous solution-digestion, filtration and washing, drying and ignition, Inorganic and organic precipitating agents. Thermo analytical techniques – types – TGA principle – instrumentation – TGA analysis of CaC_2O_4 . H_2O . Differential thermal analysis – principle – DTA of CaC_2O_4 . H_2O – factors affecting TGA and DTA.

UNIT-IV: Visible Spectrophotometry and Colorimetry

(12Hours)

Theory of spectrophotometry and colorimetry, Beer – Lambert's law (statement only), molar absorptivity and absorbance. Visual comparators – multiple standard methods, duplication and dilution method, balance method, photoelectric colorimeter, spectrophotometer. Criteria for satisfactory colorimetric estimation- advantages colorimetric estimation, determination of composition of complexes, colorimetric estimation of iron.

UNIT–V: Electroanalytical Techniques**(12 Hours)**

Electrogravimetry – theory- electro gravimetric analysis of Fe and Cu. Electrolytic separation of metals : principles –separation of copper and nickel, Electro deposition -principle– overvoltage. Coulometry –principle of coulometric analysis–coulometry at controlled potential- apparatus and technique–separation of nickel and cobalt. Amperometry titrations – principle-instruments-types-applications.

Total Lecture Hours-60**COURSE OUTCOME**

The students are able to,

1. Understand about storage and handling of chemicals, first aid methods and safety measures.
2. Understand the data analysis and separation techniques by various chromatography methods.
3. Study the concepts of gravimetric analysis, types of precipitation and thermoanalytical techniques.
4. Expose the knowledge on spectrophotometric and colorimetric techniques.
5. Gain knowledge of the various electroanalytical techniques and its applications.

TEXT BOOK(S)

1. Douglas A Skoog, Donald M West, FJ Holler, 2009. Fundamentals of Analytical Chemistry, 7th edition, Harcourt college publishers.
2. Gopalan R, Subramaniyan PS and Rengarajan K. 1993. Elements of Analytical Chemistry second revised edition, Sultanchand.
3. Gupta SC. 2018. Fundamentals of Statistics, 6th Ed., Himalaya Publications, Delhi,
4. Harris DC. 1995. Quantitative Chemical Analysis, 4th Ed., W. H. Freeman Publications, New York.
5. Hibbert DB, Gooding JJ. 2006. Data Analysis for Chemistry, Oxford University Press, UK.

REFERENCE BOOK(S)

1. Gurdeep R Chatwal, Sham K Anand. 2005. Instrumental Methods of Chemical Analysis, Himalaya publishing House.
2. Mendham J, Denny RC, Barnes JD, Thomas M Vogels. 2007. Test Book of Quantitative Chemical Analysis, 6th edition, Pearson education.
3. Sharma BK. 1997. Instrumental Methods of Chemical Analysis, Goel publishing house, Meerut
4. Skoog DA, West DM, Holler DJ. 2004. Fundamentals of Analytical Chemistry, 7th Ed., Harcourt College Publishers, Singapore.
5. Valcarcel Cases Miguel, López Lorente Àngela I, López Jiménez M Àngeles. 2008. Foundations of Analytical Chemistry, A Teaching–Learning Approach, Springer. DOI 10.1007/978-3-642-57157-2.

E-RESOURCES

1. <http://ndl.iitkgp.ac.in/document/bnZnR2hPaUVqRU9TbFc2Rmp1MVJzMDFQWHVwTENHaVhxb2h6bnpCWHMzYz0>
2. [http://www.freebookcentre.net/chemistry-books-download/Analytical-Chemistry-Vol-1-\(PDF\).html](http://www.freebookcentre.net/chemistry-books-download/Analytical-Chemistry-Vol-1-(PDF).html).
3. <https://www.hindawi.com>
4. <https://www.wiley.com/en-us/Analytical+Chemistry>
5. <https://byjus.com/chemistry/analytical-chemistry>
6. <http://files.pharmtech.com/article-795448>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)



DEPARTMENT OF CHEMISTRY

Semester: V-SBE-II: Textile Chemistry

Ins.Hrs./Week:2

Course Credit:2 Course Code:R23SBECH2

UNIT I Classification of Fibres (5Hours)

General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a) natural cellulose fibres (cotton and jute) (b) natural protein fibre(woolandsilk)

UNIT II Structure and Properties of Fibres (7Hours)

Chemical structure, production, properties and uses of the following synthetic fibres. (1) Manmade cellulosic fibres (rayon, modified cellulose fibre) (2) polyamide fibre(different types of nylon)(3)polyesterfibres

UNIT III Impurities of Fibres (5Hours)

Impurities in raw cotton and grew cloth, wool and silk- general principles of the removal – scouring–bleaching–desizing–kierboiling–chemicking.

UNIT IV Dyeing (6 Hours)

Dyeing – Dyeing of wool and silk – Fastness properties of dyed materials – dyeing of nylon,terylene and other synthetic fibres.

UNIT V Finishing (7Hours)

Finishing- finishes given to fabrics – mechanical finishes on cotton, wool and silk, method used inprocess of mercerizing-anti-crease and anti-shrink finishes-waterproofing.

Total Lectures Hours-30

COURSE OUTCOME

The students are able to,

1. Understand the different types of fibres.
2. Describe the various types of nylon.
3. Discuss the concept of bleaching and chemicking.
4. Understand the process of dyeing.
5. Acquireknowledgeaboutactionsthefinishingandwaterproofingmethodology.

TEXT BOOK(S)

1. Hall.A.J, 2009.TextbookofTextileScience1stedition, DorlingKindersley(India)Pvt.Ltd.,NewDelhi.
2. KapurK.2010. TextBookofAppliedChemistry,3rd edn,wileypublications.
3. Thomas Bechtold and Tung Pham, 2019. Textile Chemistry, 1stedn,Springer-Verlag,NewYork
4. Vishu Arora.2011.TextileChemistry,1stedition,ArtechHouse,Boston.
5. VatsalaR. 2009.TextbookofTextiliesandClothing, 1stedn,AtlanticPublishersandDistributors.

REFERENC EBOOK(S)

1. BrunoNuntak.2007.TheIdentificationofTextileFibres,1stedition,RSCpublications.
2. DeGruyter.2009.TextileChemistry, 1stedn, TungPham.
3. MaryoryLJoseph.2012.IntroductiontoTextileScience,3rdedition,JohnWileyandSons,C hichester.
4. SadovF,HorchaginM,MatetshyA.2007.ChemicalTechnologyoffibrousMaterials1st edition,Mirpublishers
5. SherazAhmad,AliAfzal. 2004.AdvancedTextileTestingTechniques,1stedition,DorlingKindersley(India)Pvt.Ltd .,NewDelhi.

E-RESOURCES

1. <https://www.careers360.com>
2. <https://www2.cs.arizona.edu>
3. <https://www.globalspec.com>
4. <https://www.textileworld.com>
5. <https://www.myclassroom.com>
6. <https://www.acs.org>

SENGAMALA THAYAA REDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: V-SBE-III: Polymer Chemistry

Ins.Hrs./Week:2

Course Credit:2 Course Code:R23SBECH3

UNIT I Basic Concepts in Polymers (6Hours)

Introduction, classification of polymers. Polymerization—step polymerization, chain polymerization and co-ordination polymerization. Catalysts in polymerization, degree of polymerization, Chain length Polymerization.

UNIT II Polymerization Techniques (5 Hours)

General methods of polymerization bulk, solution, suspension and emulsion polymerization. Study of commercial polymers— poly acrylonitrile, poly methyl methacrylate, poly urethanes, polyvinylchloride, polytetrafluoro ethylene, polyamides.

UNIT III Characterisation of Polymers (7Hours)

Characterisation of polymers—chemical structure and polymer properties. Degree of crystallinity, T_m , T_g , mechanical, electrical, thermal, optical and chemical properties. Molecular weights and averages—number average, weight average, molecular weight distribution.

UNIT IV Polymer Degradation (7Hours)

Polymer degradation— definition, types. Thermal degradation, mechanical degradation. Photodegradation, oxidative degradation—rubber oxidation, ozone oxidation.

UNIT V Compounding and Fabrication (5 Hours)

Compounding – compounding materials and their significances. Vulcanization of Rubber. Fabrication – Techniques – Compression, injection, lamination mouldings. Applications of polymers and plastics.

Total Lectures Hours-30

COURSE OUTCOME

The students will be able to,

1. Understand the different mechanism of polymerization
2. Explain the polymerization techniques and commercial applications of different polymers
3. Determine the molecular weight of polymers by various methods
4. Categorize various degradation types of polymers
5. Learn the fabrication techniques and applications of polymers

TEXT BOOK(S)

1. BillmeyerFW.1984. Text book of polymer science, 1steditionJr. JohnWileyandSonsPublication.
2. ChandS. 2004. ATextBookofPolymerChemistry, 1stedn, RSCpublications.
3. FredWBillmeyer.2004.TextbookofPolymer Science, 1stedition,DorlingKindersley,India,Pvt.Ltd.,NewDelhi.
4. GowarikorVR. ViswanathanNV.JayadevSreedhar.2005.PolymerScience,Revisedediti on,NewAgeInternationalPvt.Ltd.,
5. RobertJYoung,PeterALovell.2011. IntroductiontoPolymers,1stedition,RSCpublications.

REFERENCE BOOK(S)

1. AroraM.G.,SinghM.andYadavM.S.,1989.PolymerChemistry,2ndRevisededition,anmol Publications PrivateLtd.,New Delhi.
2. Fred.W.BillmeyerJR,2007. Polymer Chemistry, 3rdedition John Wiley & Sons (P)Ltd.
3. Odian.G,2012. Principlesofpolymerization, 2ndedn., JohnWiley&Sons, New York
4. PaulaHammond,2006.SyntheticofPolymers,1stedition,JohnWiley&Sons(P)Ltd.
5. Sharma,B.K. 1989.PolymerChemistry, GoelPublishingHouse, Meerut.

E-RESOURCES

1. <https://www.acs.org>
2. <https://www.hilarispublisher.com>
3. <https://www.frontiersin.org>
4. <https://onlinelibrary.wiley.com>
5. <https://www.sigmaaldrich.com>



**Bharathidasan University
Tiruchirappalli-620024.**

**Candidates admitted in the Academic year 2018-2019 onwards FOR ALL
UG COURSES**

Soft Skills Development

Learning Objective

Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This paper intends to enable students to achieve excellence in both personal and professional life.

Unit I

Know Thyself/Understanding Self

Introduction to Soft skills-Self discovery-Developing positive attitude-Improving perceptions-Forming values.

Unit II

Interpersonal Skills/Understanding Others

Developing interpersonal relationship-Team building-group dynamics-Networking-Improved work relationship.

Unit III

Communication Skills/Communication with others

Art of listening-Art of reading-Art of speaking- Art of writing-Art of writing e-mails-e-mail etiquette.

Unit IV

Corporate Skills/Working with Others

Developing body language-Practising etiquette and mannerism-Time management-Stress management.

Unit V

Selling Self/Job Hunting

Writing resume/CV-interview skills-Group discussion-Mock interview-Mock GD-Goal setting-Career planning.

Text Book

**A book on development of Soft Skills Dr.K.Meena & Dr.V.Ayothi
Soft Skills.Dr.K.AlexS.Chand & Company Ltd.RamNagar,NewDelhi-110 055**

Reference Books

- (i) **Developing the leader with in you John C Maxwell**
- (ii) **Good to Great by JimCollins**
- (iii) **The Seven habits of highly effective people Stephen Covey**
- (iv) **Emotional Intelligence Daniel Goleman**
- (v) **You can winShive Khera**
- (vi) **Principle centered leadership Stephen Covey**

SEMESTERVI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAL, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester: VI-CC-VIII: Organic Chemistry-II

Ins.Hrs./Week:6

Course Credit:6

Course Code:R23CH613

UNIT I Chemistry of Carbohydrates

(15Hours)

Carbohydrates - classification, properties of mono saccharide (glucose and fructose), structure and configuration of mono saccharide, interconversion, ascending and descending series, mutarotation, epimerisation- cyclic structure - determination of size of sugar rings - disaccharide - sucrose, maltose - structure elucidation - polysaccharide - starch and cellulose (elementary treatment).

UNIT II Chemistry of Proteins and Vitamins

(15Hours)

Amino acids - Classification – Zwitter ion – isoelectric point - 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. Vitamins - classification, structure and biological importance of vitamins A, B₁ and C.

UNIT III Chemistry of Alkaloids and Terpenoids

(15Hours)

Fatty acids - Definition, nomenclature, classification, properties and biological significance. Lipids - Definition, classifications properties and biological functions. Simple lipids: oils and waxes. Compound lipids - Definition, properties, structure and functions - Phospholipids, sphingolipids and glycolipids. Lipoproteins – classification and composition. Derived lipids - Definition, properties, structure and functions of steroids. Prostaglandin - Classification, properties, structure and functions.

UNIT IV Molecular Rearrangements

(15Hours)

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

(15Hours)

UV-VIS spectroscopy - types of electronic transitions – Instrumentation - solvent effect on λ_{max} - Woodward - Fieser rules for calculation of λ_{max} : dienes only – bathochromic shift and Hypochromic shift.

IR spectroscopy - number and types of fundamental vibrations – selection rules - modes of vibrations and their energies. Instrumentation - position of IR absorption frequencies for functional groups like aldehyde, ketone, alcohol, acid, amine and amide.

Mass Spectrometry - Instrumentation – Base peak, isotopic peaks, metastable peak, parent peak, determination of molecular formula, recognition of molecular ion peak – Fragmentation – General rules – Pattern of fragmentation for various classes of compounds, McLafferty rearrangement, Importance of metastable peaks.

Total Lectures Hours-75

COURSE OUTCOME

The students are able to,

1. Understand the fundamental properties and reactivity of biologically important molecule.
2. Understand the general role of vitamins and proteins in the body.
3. Understand the Classification and Composition of Alkaloids and Terpenoids.
4. Different types of Molecular Rearrangement.
5. Observe the spectroscopy techniques for the elucidation of structures

TEXTBOOK(S)

1. Jerry March. 2004. Advanced Organic Chemistry – Reaction Mechanisms and Structure, John Wiley, New York,
2. Lowry THE, Richardson KS. 1998. Mechanism and Theory in Organic Chemistry, Addison-Wesley, USA,
3. Morrison RT, Boyd RN. 2011. Organic Chemistry, 7th Ed., Pearson, New Delhi,
4. Webster RM, Silverstein F. 2015. Spectroscopy identification of Organic compounds, edition, CRC Press,
5. William Kemp. Organic Spectroscopy, 3rd edition, ELBS.

REFERENCE BOOK(S)

1. Bah IBS, Bah IA. 2010. Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.,
2. Finar IL. 1996. Organic Chemistry, Vol 1 & 2, 6th edition, Addison Wesley Longman Ltd., England,
3. Morrison RT, Boyd RN, Bhattacharjee SK. 2011. Organic Chemistry 7th edition, Pearson, India.
4. Pavia DL, Lampman GM, Kriz GS Vyvyan, J.A., 2015. Introduction to Spectroscopy 5th edition, Cengage Learning,
5. Pine SH. 1985. Organic Chemistry, 5th edition, McGraw-Hill International Book Company, New Delhi.
6. Seyhan N Ege. 2005. Organic Chemistry, 5th edition, Houghton Mifflin Co., New York.

E-RESOURCES

1. <https://www.lecturio.com/magazine/chemistry-of-carbohydrates/>
2. <https://www.bing.com/aclick>
3. http://oms.bdu.ac.in/ec/admin/contents/1_16scch8_2020051904202312.pdf.
4. <http://www.chem.iitb.ac.in/~kpk/ra.pdf>
5. <https://www.lehigh.edu/~kjs0/carey-13.pdf>.

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2022 – 2023)
DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: VI-CC-IX: Physical Chemistry-II

Ins. Hrs./Week: 6

Course Credit: 6

Course Code:R23CH614

UNIT-I:Electrical Conductance

(15Hours)

Conductance in metal and in electrolyte solution – specific conductance and equivalent conductance. Arrhenius theory of electrolytic dissociation and its limitation. Weak and strong electrolyte according to Arrhenius theory. Ostwald's dilution law- Derivation, applications and limitation. Effect of dilution on equivalent conductance and specific conductance. Kohlrausch's law and its applications. The elementary treatment of the Debye- Huckel- Onsager equation for strong electrolytes-evidence for ionic atmosphere. Transport number and Hittrof's method and moving boundary method - Conductometric titrations.

UNIT –II:Electrochemical Cells

(15Hours)

Galvanic cells - reversible and irreversible cells. Electromotive force of a cell and its measurement – computation of E.M. F. Types of reversible electrodes- gas/metal ion- metal/metal ion, metal/ insoluble salt/anion and redox electrodes, electrode reactions. Nernst equation – derivation of cell E. M. F and single electrode potential – standard hydrogen electrode- reference electrodes- standard electrode potentials.

Potentiometric titrations -Acid-Base titrations- Oxidation-reduction (Redox) titrations- Precipitation titrations.

UNIT–III:Catalysis and Surface Phenomena

(15Hours)

Catalyst - Definition and characteristics- Types of catalysis - Homogenous and heterogeneous induced, auto, positive and negative catalysis, catalytic Poisons and Catalytic promotors.Enzyme catalysis – Michaelis – Menten equation and Michaelis Menten law. Adsorption types - Chemical and Physical, characteristics of adsorption. Theories of catalysis. Intermediate compound formation theory and adsorption theory. Different types of isotherm - Freundlich and Langmuir adsorption isotherms.

UNIT-IV:Spectroscopy- I

(15Hours)

Electromagnetic spectrum-the region of various types of spectra. Microwave spectroscopy - Rotational spectra of diatomic molecules treated as a rigid rotator, Condition for molecule to be active in microwave region. Rotational Constants (B) and selection rule for rotational transition. Frequency of spectral lines calculation of internuclear distance in diatomic molecules.

Infrared spectroscopy – vibrations of diatomic molecules-harmonic oscillators, Zero point energy, dissociation energy and force constant, condition for molecule to be active in the IR region, selection rule for vibrational transition, fundamental bands, overtones and hot bands.

UNIT-V: Spectroscopy – II

(15Hours)

Raman spectroscopy- Rayleigh scattering and Raman scattering. Stokes and antistokes line in Raman spectra, Raman frequency, quantum theory of Raman effect, Conditions for a molecule to be Raman active. Comparison of Raman and IR Spectra- Structural determination from Raman and IR spectroscopy, Mutual exclusion principle. NMR Spectroscopy-nuclear spin condition for a molecule to give rise to NMR spectrum- theory of NMR spectra, number of NMR signals, equivalent and non-equivalent protons.

Total Lectures Hours- 90

COURSE OUTCOME

The students will be able to,

1. Describe investigation leading to the substances as conductor and non conductor.
2. Understand the mode of action of catalysis, classification of catalyst and comparison of homogeneous and heterogeneous catalysis
3. Acquire knowledge to successfully use data obtained by each teaching to characterize inorganic and organometallic compounds.
4. Gain the knowledge of NMR spectroscopy.
5. Know the theories of Electromagnetic spectrum.

TEXT BOOK(S)

1. Banwell C.N, and Mc Cash E.M, 2007. Fundamentals of Molecular Spectroscopy, 4th edition, Tata Mc Graw hill Pvt.Ltd.
2. Samuel Glasstone . 2006. An Introduction to Electrochemistry. East -West Press Pvt Ltd, New Delhi.
3. Sharma, Elementary Y.R, 2009. Organic Spectroscopy, 5th edition, Sultan Chand and sons.
4. Sharma, Y.R. 1992. Elementary Organic Spectroscopy – Principles and Chemical Techniques. University Press, Hyderabad.
5. Syed Aftab Iqbal and Ishaq Zaafrani. 2011. Text Book of Electrochemistry. Discovery Publishing Pvt Ltd, New Delhi.

REFERENCE BOOK(S)

1. Bahl BS, Arun Bahl and Tuli GD. 2012. Essentials of Physical chemistry, Sultan Chand and Sons, New Delhi.
2. Colin Bannwell N and Elaine Mc Cash M. Fundamentals of Molecular Spectroscopy, 4th edition, Mc Graw hill publishing company limited.
3. Glass stone S. and Lewis D. Elements of Physical Chemistry, Mac Millan& Co Ltd, , London.
4. Moore WJ. 1972. Physical Chemistry, 5th Edition, Orient Longman Ltd, New Delhi.
5. Puri BR. Sharma LR, Pathania MS. 2018, Principles of Physical Chemistry, 35th edition, Shobana Lal Nagin chand and Co, New Delhi
6. Russell S Drago. 1978. Physical Methods in Inorganic chemistry, East-West student edition.

E-RESOURCES

1. <http://ncert.nic.in/textbook/pdf/lech103.pdf>
2. <https://www.springer.com/gp/chemistry/electrochemistry>
3. <https://www.elsevier.com/books/surface-chemistry/bikerman/978-1-4832-2937-9>
4. <https://www.springer.com/gp/book/9781468417876>
5. <http://www.digitalbookindex.org/search/search010chemspectroscopya.asp>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI-614016

(For the Candidates admitted in the academic year 2022– 2023)

Semester: VI-CP-VI: Gravimetric Analysis(P)

Ins.Hrs./Week:6

CourseCredit:3 CourseCode:R23CH615P

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 of Barium as Barium sulphate.

Scheme of Valuation:

Max.Marks

Internal	40Marks
External	60Marks
Record	10Marks
Procedure Writing	5Marks

Results

<2%	-	45Marks
2-3%	-	35Marks
3-4%	-	25Marks
>4%	-	15Marks

COURSE OUTCOME

The students are able to,

1. Understand how to estimate the amount of ions during Gravimetric Analysis technique.
2. Work with modern synthetic reactions will illustrate the importance of gravimetric analysis
3. Understand the techniques of gravimetric analysis.
4. Determine the concentration of cations.
5. Focused on detecting ions in an aqueous solution.

TEXT BOOK(S)

1. John Charles Olsen. 2015. Text Book of Quantitative Chemical Analysis. Arkose Press, New Delhi.
2. Nicholas Knight. 2016. A Course in Quantitative Chemical Analysis Gravimetric and Volumetric. Leopold Classic Library. Australia.
3. Pandey OP, Bajpai DN, Giri S Dr. 2010. Practical Chemistry. Revised Edition, S. Chand, New Delhi.
4. Venkateswaran. V, Veeraswamy. R, Kulanthaivelu. A. R. 2015. Basic Principles of Practical Chemistry. Sultan Chand & Sons, New Delhi.
5. Vogel, A. I. 2000. Text Book of Quantitative Inorganic Analysis; 6th Ed., Longman,

REFERENCE BOOK(S)

1. John Charles Olsen. 2010. Text Book of Quantitative Chemical Analysis. Nabu Press,
2. Shikha Gulati, Sharma. J. L. Shagun Manocha. 2017. Practical Inorganic Chemistry. CBS Publisher, Chennai.
3. Henry Morton, Alfert. R. 2015. The Students Practical Chemistry. Palala Press.

4. Erdey.L.2013.GravimetricAnalysisPart2.Vol7. Pergamon,Oxford.
5. John G Watson, Richard J Tropp, Steven D Kohl, Xiaoliang Wang, Judith C Chow.2017. Filter Processing and Gravimetric Analysis for Suspended Particulate Matter samples.Aerosol Science and Engineering,1(2),93-105.

E-RESOURCES

1. <https://www.elsevier.com/books/gravimetric-analysis/erdey/978-1-4831-9756-2>
2. <https://www.sciencedirect.com/book/9781483197647/gravimetric-analysis>
3. https://books.google.com/books/about/Gravimetric_Analysis.html?id=MxkSBQAAQB
AJ
4. https://books.google.com/books/about/Gravimetric_Analysis.html?id=7RoSBQAAQB
AJ
5. <https://www.amazon.in/Gravimetric-Analysis-International-Monographs-Analytical-ebook/dp/B01DT29BUU>
6. <https://doi.org/10.1007/s41810-017-0010-4>.

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI -614016

(For the Candidates admitted in the academic year 2022–2023)

DEPARTMENT OF CHEMISTRY

Semester:VI-MBE-II:Nuclear, Industrial Chemistry& Metallic State

Ins.Hrs./Week:5

Course Credit:3

CourseCode:R23MBECH2:1

UNIT-I: Nuclear Chemistry I

(15Hours)

Introduction, nuclear structure – composition of the nucleus, subatomic particles, nuclear forces, nuclear stability – mass defect and binding energy, whole number rule and packing fraction, n-p ratio, odd even rules – liquid drop and shell models, isobars, isotones and isomers.

Isotopes – detection, physical and chemical methods of separation, isotopic constitution of elements-Radioactivity – introduction – radioactive emanations- characteristics of α , β and gamma rays,

UNIT–II: Nuclear Chemistry II

(15Hours)

Detection and measurement of radioactivity-Wilson cloud chamber, Geiger-Muller Counter. Particle accelerators – Linear accelerator and cyclotron. Artificial Radioactivity – nuclear transformation – classification of nuclear reactions, fission – atom bomb, fusion – hydrogen bomb, stellar energy – nuclear reactor – atomic power projects in india. Applications of radioisotopes as trackers in reaction mechanism, medicine, agriculture, industry and carbon dating, Hazards of radiations.

UNIT–III: Metallic State

(15 Hours)

Metallic bond-Packing of atoms in metal (BCC, CCP, HCP) electron gas, Pauling and band theories, Structure of alloys, substitutional and interstitial solid solutions, Hume – Rothery ratios, crystal defects – stoichiometric and non- stoichiometric defects. Semiconductors – intrinsic and extrinsic – n-type and p-type composition, properties, structure and uses in electronic industry.

UNIT-IV: Inorganic Polymers

(15Hours)

In organic polymers–coordination polymers, metal alkalis, phosphor nitrilic polymers. Silicates – Classification in to discrete anions – one, two and three dimensional structures with typical examples. Composition, properties and uses of beryl, asbestos, talc, mica, feldspar and zeolite.

UNIT–V: Industrial Chemistry

(15Hours)

Gaseous fuels -Natural gas, gobar gas, water gas, semi water gas, producer gas and LPG composition, manufacture and its applications.

Safety matches-Introduction, raw materials and manufacturing methods. Paints and varnishes : Definitions, types and compositions. Glass: Composition, manufacture, types and uses.

Cement: manufacture, Wet and Dry processes, composition and setting of cement.

Total Lectures Hours-75

COURSE OUTCOME

The students are able to,

1. Analyse the fundamentals of nuclear chemistry.
2. Understand the nuclear reaction and its applications.
3. Understand the concepts of metallic bonds and its applications.
4. Discuss about the structure and properties of inorganic polymers.
5. Explain the applications of fertilizers, paints, glass and cements.

TEXT BOOK(S)

1. GopalanR, Subramaniyan PS. Rengarajan K. 1991. Elements of Analytical Chemistry, Sultan Chand & sons, 2nd edition,
2. Gowariker VR, Viswathan NV. Jayadevm. 2019. Polymer Science, Third edition, New Age International Publishers.
3. Kent JA, 2002. Reigels Hand book of Industrial Chemistry, 9th edition, Reigels publications
4. Madhan, RD. 1987. Text Book of Modern Inorganic Chemistry, 2nd edition, S. Chand & Company Ltd.,
5. Soni PL, Mohan Kathyal. 2013. Text Book of Inorganic Chemistry, Sultan Chand & Sons.

REFERENCE BOOK(S)

1. Gilreath, 1985. Fundamental Concept of Inorganic Chemistry, 18th printing Mc Graw Hill Intl Book Company
2. Glasstone S. 1967. Source Book on Atomic Energy, East-west press.
3. Heaton CA. An introduction to Industrial Chemistry, Springer Science & Business Media.
4. Mehrotra RC. 2007. Organometallic Chemistry. New Age International
5. Saxena. PB. 2007. Inorganic Polymers, Discovery Publishing House, New Delhi.

E-RESOURCES

1. <http://nsdl.niscair.res.in/handle/123456789/255>
2. <https://www.chemistryabc.com/b-d-gupta-organo-metalic-chemistry-pdf/>
3. https://cds.cern.ch/record/905183/files/0471115320_TOC.pdf
4. <https://goldbook.iupac.org/terms/view/it07515>
5. <https://www.internetchemistry.com/chemistry/industrial-chemistry.php>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI-614016
(For the Candidates admitted in the academic year 2022– 2023)

DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY

Semester: VI- MBE-II: Solid State Chemistry

Ins.Hrs./Week:6 Course Credit:3 Course Code:R23MBECH2:2

UNIT- I: Basic Concepts In Supra molecular Chemistry (15 Hours)

Concepts and Languages of supramolecular chemistry. Various types of non-covalent interactions. Hydrogen bonds, C-H...X interactions, Halogen bonds. π - π interactions, Non-bonded interactions. Various types of molecular recognition.

UNIT-II: Organometallic Systems (15Hours)

Combinations of different interactions to design molecular rods, triangles, ladders, networks, etc. Design of nanoporous solids. Interligand hydrogen bonds in metal complexes.

UNIT-III: Preparative Methods in Solid State Chemistry (15Hours)

General principles of solid state chemistry - Experimental procedure, Co precipitation as a precursor to solid state reaction, Other precursor methods, Kinetics of solid state reactions – Crystallizations of solutions, melts, glasses and gels, Solutions and gels: zeolite synthesis.

UNIT-IV: Magnetic Materials (15Hours)

Selected examples of magnetic materials, their structures and properties - Metals and alloys, Transition metal oxides, Spinel, Garnet, Ilmenite and perovskite, Magnetoplumbite. Applications: structure/property relations: Transformer, Information storage, Magnetic bubble memory devices, Permanent magnets.

UNIT-V: Organic Solid-State Chemistry (17Hours)

Topochemical control of solid state organic reactions: Intra molecular reactions: conformational effects, Intermolecular reactions :molecular packing effects, Photodimerization of o-ethoxy-trans-cinnamic acid (α form, β form, γ form), Photopolymerizations of diacetylenes.

Total Lectures Hours-75

COURSE OUTCOME

The students are able to,

1. Discuss the various types of noncovalent Interactions.
2. Describe the Inter ligand hydrogen bond metal complexes
3. Understand the Preparative Methods In Solid State Chemistry
4. Gain knowledge on kinetics of solid state reactions.
5. Understand the mechanisms of photodimerization, photopolymerization reactions.

TEXT BOOK(S)

1. Anthony R West. 2014. Solid State Chemistry and its Applications, Wiley, 2nd Ed, Cambridge University Press,

2. ChakrabartyDK2021. Solid State Chemistry, New Age International Publishers,2ndEd,.
3. CoeyJMD. 2012.Magnetism and Magnetic Material Cambridge University Press,
4. Katsuhiko Ariga,Toyokikunitake.2006.Supramolecular Chemistry-Fundamentals and Applications, springer,
5. LehnJ.1995.Supramolecular Chemistry,VCH,Wienheim

REFERENCE BOOK(S)

1. AsimKDas and MahuaDas.2020.An Introduction to Supramolecular Chemistry,CBS publishes & Distributors PvtLtd,1stEd,
2. Desiraju GR.Steiner T.1999.TheWeak Hydrogen Bonding Structural Chemistry and Biology:Oxford University press: Oxford,.
3. JeffreyGAV. 1997.Introduction to Hydrogen Bonding, Oxford University press: NewYork, .
4. LehnJM.1999. Transition Metals in Supramolecular Chemistry:John Wiley & sons:New York,.
5. PeterJCragg.2011.SupramolecularChemistry,Springer,

E-RESOURCES

1. <https://byjus.com/jee/magnetic-properties-of-materials/>
2. <https://pubs.acs.org/doi/10.1021/acs.chemrev.5b00352>
3. <https://www.kofo.mpg.de/en/research/organometallic-chemistry>
4. <https://www.taylorfrancis.com/books/edit/10.1201/9780429027284/solid-state-chemistry-elaine-moore-lesley-smart>
5. <https://pubs.rsc.org/en/content/articlelanding/2014/sc/c4sc02211d>



**Bharathidasan University
Tiruchirappalli–620024.**

**FORALLUG COURSES
Gender studies**

Objectives

- ❖ To make boys and girls aware of each other strengths and weakness
- ❖ To develop sensitivity towards both genders in order to lead an ethically enriched life.
- ❖ To promote attitudinal change towards a gender balanced ambience and Women empowerment.

Unit I Concepts of Gender:

Sex-Gender-Biological Determinism-Patriarchy-Feminism-Gender Discrimination-Gender Division of Labour-Gender Stereotyping-Gender Sensitivity-Gender Equity-Equality-Gender Mainstreaming-Empowerment.

Unit II Women's Studies Vs Gender Studies:

UGC's Guidelines – VII to XI plans-Gender Studies: Beijing Conference and CEDAW-Exclusiveness and inclusiveness.

Unit III Areas of Gender Discrimination:

Family-Sex Ratio-Literacy-Health-Governance-Religion Work Vs Employment-Market-Media-Politics-Law-Domestic Violence-Sexual Harassment-State Policies and Planning.

Unit IV Women Development and Gender Empowerment:

Initiatives-International Women's Decade-International Empowerment year year 2001-Mainstreaming Global Policies.

Unit V Women's Movements and Safe guarding Mechanism:

In India National/State Commission for Women(NCW)-All Women Police Station-Family Court-Domestic Violence Act-Prevention of Sexual Harassment at Work placeSupremeCourtGuidelines-Maternity BenefitAct-HinduSuccessionAct2005-EveTeasing Prevent Act-Self Help Groups-73rdand74thAmendmentforPRIS