

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



(Affiliated to Bharathidasan University)
(Accredited by NAAC; An ISO 9001:2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI – 614016.
TAMILNADU, INDIA.

B.Sc., CHEMISTRY
COURSE STRUCTURE WITH REVISED SYLLABUS UNDER CBCS
(For the candidates admitted in the academic year 2021–2022)



SENGAMALATHAYAAREEDUCATIONALTRUSTWOMEN'SCOLLEGE

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TAMILNADU, INDIA.

B.Sc., CHEMISTRY COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2021-2022)

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	Course Code	Title of the Course	Inst. Hours /Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
I	I	Language Course (LC)-I- Tamil*/Other Languages **#	21LC101	Ikkala Ilakkiyam	6	3	3	25	75	100	
	II	English Language Course (ELC)-I	21ELC101	Language through Literature I (Prose and Communication Skills)	6	3	3	25	75	100	
	III		Core Course (CC)-I	21CH101	General Chemistry - I	6	5	3	25	75	100
			Core Practical (CP)-I	21CH102P	Volumetric Analysis (P)	3	3	3	40	60	100
			Allied Course (AC)-I	21ABO101	Mathematics - I Calculus / Botany - I	4	3	3	25	75	100
			Allied Practical (AP)-I	21AMM102/ 21ABO102P	Mathematics - II Algebra & Analytical Geometry 3D/Botany (PI)	3 3	2	3	25 40	75 60	100 100
	IV	Value Education	18UGVED	Value Education	2	2	3	25	75	100	
TOTAL					30	21	-	-	-	700	
II	I	Language Course (LC) -II- Tamil*/Other Languages**#	21LC201	Idaikkala Ilakkiyamum Pudinamum	6	3	3	25	75	100	
	II	English Language Course (ELC) -II	21ELC201	Language through Literature II (Poetry and Communication Skills)	6	3	3	25	75	100	
	III		Core Course (CC)-II	21CH203	General Chemistry - II	6	5	3	25	75	100
			Core Practical (CP) -II	21CH204P	Organic & Inorganic Preparations (P)	3	3	3	40	60	100
			Allied Course (AC)-II	21AMM203	Mathematics-III Trigonometry & Fourier series / Botany (PII)	3 3	2	3	25 40	75 60	100 100
			Allied Practical (AP)-II	21AMM204/ 21ABO203P	Mathematics - IV ODE, PDE and Laplace Transforms / Botany -II	4 3	3	3	25 40	75 60	100 100
	IV	Environmental Studies	19UGCES	Environmental Studies	2	2	3	25	75	100	
TOTAL					30	21	-	-	-	700	
I	I	Language Course (LC) -III Tamil*/Other Languages**#			6	3	3	25	75	100	
	II	English Language Course (ELC)-III			6	3	3	25	75	100	

Sem.	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours /Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
III	III	Core Course(CC)-III			6	5	3	25	75	100	
		Core Practical (CP)-III			3	3	3	40	60	100	
		Allied Course(AC)-III			4	3	3	25	75	100	
		Allied Practical(AP)-III			3	2	3	40	60	100	
IV	IV	NonMajorElectiveI-for those who studied Tamil under Part-I a) BasicTamil for other language students b) Special Tamil for those who studied Tamil upto +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**#			6	3	3	25	75	100	
		English Language Course(ELC)-IV			6	3	3	25	75	100	
	III	Core Course(CC)-IV			4	4	3	25	75	100	
		Core Practical (CP)-IV			3	3	3	40	60	100	
		Allied Course(AC)-IV			4	3	3	25	75	100	
		Allied Practical(AP)-IV			3	2	3	40	60	100	
	IV	IV	Non Major Elective(NME)-II –for those who studied Tamil under PartI a).BasicTamil for other language students b). SpecialTamil for those who studied Tamil upto +2 but opt for other languages in degree programme			2	2	3	25	75	100
			Skill Based Elective(SBE)-I			2	2	3	25	75	100
			TOTAL			30	22	-	-	-	800
	V	III	Core Course (CC)-V			5	5	3	25	75	100
Core Course(CC)-VI					5	5	3	25	75	100	
Core Course (CC)-VII					6	5	3	25	75	100	
Core Practical(CP)-V					3	3	3	40	60	100	
IV		Major Based Elective (MBE)-I			5	4	3	25	75	100	
		Skill Based Elective (SBE)-II			2	2	3	25	75	100	
		Skill Based Elective(SBE)-III			2	2	3	25	75	100	
		Soft Skills Development			2	2	3	25	75	100	
					30	28	-	-	-	800	
VI	III	Core Course (CC)-VIII			6	6	3	25	75	100	
		Core Course (CC)-IX			6	6	3	25	75	100	
		Core Practical(CP)-VI			5	3	3	40	60	100	
		Major Based Elective(MBE)-II			6	5	3	25	75	100	
		Core Course (CC)-X			6	6	3	25	75	100	
	V	Extension Activities			1	1	3	25	75	100	
		Gender Studies			-						

Sem.	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours /Week	Credit	Exam Hours	Marks		Total
								CIA	ESE	
			TOTAL		30	27	-	-	-	600
				G. 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	46
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	09
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 upto 10th +2 (Regular Stream);
+Syllabus for other Languages should be on part with Tamil at degree level;
those who studied Tamil upto 10th +2 but opt for other
languages in degree level under Part I should study special
Tamil in Part IV;
**Extension Activities shall be outside instruction hours.

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is 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 75 marks[i.e. 30marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40marks[i.e.16marks]
The passing minimum for ESE shall be40% out of 60 marks [i.e.24marks]

NON MAJOR ELECTIVE(NME)OFFERED BY THE DEPARTMENT

Semester	Part	Course	Title of the Course	Title of the Paper
III		NME-I		
IV		NME- II		

**SKILL BASED ELECTIVE (SBE) OFFERED BY THE DEPARTMENT
(INDUSTRIAL CHEMISTRY)**

Semester	Part	Course	Title of the Course	Title of the Paper
IV		SBE-I		
V		SBE - II		
V		SBE - III		

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TAMILNADU, INDIA.

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

(For the candidates admitted in the academic year 2020–2021)

Question Paper Pattern - (Theory)

Max time: 3 Hours

Max Marks: 75

Section – A (10 x 2 = 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 |
| b | | |
| 12. a (or) | } | Unit II |
| b | | |
| 13. a (or) | } | Unit III |
| 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:

OBJECTIVES

- To learn the periodic properties of elements and its classifications.
- To understand the theoretical aspects of qualitative and quantitative analyses.
- To learn about the types, preparation and properties of sols, colloids and emulsions and the determination of molecular weight of macromolecules.

UNIT- I: Periodic Table and Properties

(18 Hours)

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.

Periodic properties of elements – variation of atomic volume, atomic and ionic radii, Ionization potential - electron affinity – electronegativity along periods and groups - Pauling scale and Milliken scale of electronegativity - Classification of elements into s, p, d and f block elements.

UNIT –II: Principles of Wet Chemical Analysis and Acid Base Theory (18 Hours)

Qualitative Analysis: Solubility Product–Principle of Elimination of interfering anions - Common ion Effect – Complexation reactions including spot tests in qualitative analysis – Reactions involved in separation and identifications of cations and anions in the analysis – Semi Micro Techniques.

Acids and Bases: Arrhenius-Lewis, Bronsted-Lowry Theory of Acids and Bases – Usanovich generalized definition – Relative strengths of Acids and Bases – Dissociation constant of Acids and Bases – Levelling effect of water - Hard and soft acids and bases (HSAB) principle.

UNIT III Basic Concepts in Organic Chemistry

(18 Hours)

Cleavage of bonds – homolytic and heterolytic fission of carbon-carbon bond, Multiple bond and their characteristics-bond length, bond angle, bond energy, bond polarity and dipole moment - Electron displacement effects- inductive, mesomeric, Electrometric, resonance and hyper conjugative effects and hyperconjugation - Classification of organic compounds - Functional groups- naming of organic compounds - types of organic reactions - addition, substitution, elimination, rearrangement, photo chemical and redox reactions - Reactive intermediates- generation and stabilities of free radicals, Carbocation and carbanion.

UNIT IV Chemistry of Alkanes, Alkenes and Alkynes (18 Hours)

Alkanes – sources of alkanes – Nomenclature- structure - general preparation – Physical, Chemical properties – conformational analysis of ethane and n-butane.

Alkenes: Nomenclature – Petroleum source of alkenes – structure - General methods of preparation of alkenes – Physical, Chemical properties – Markovnikov's rule and Saytzeff rule - Peroxide Effect - Uses

Characteristics of nucleophilic, electrophilic and free radical reactions- Reaction mechanism- Elimination reaction (E₁ & E₂) - Hoffman elimination.

Alkynes: Nomenclature – structure -General methods of preparation – Physical properties – Chemical properties – Uses.

UNIT V Colloids (18 Hours)

Definition and types of Colloids- preparation – Purification (dialysis Electro dialysis and (Ultrafiltration) and stability of colloids-gold number- Properties of colloids - kinetic, optical and electrical properties. Emulsions –Types of emulsions, preparation, properties and applications - Donna membrane equilibrium. Osmosis – reverse osmosis and desalination.

Total Lecture Hours - 90**COURSE OUTCOME**

The students are able to,

1. Understand how chemicals should be handled.
2. Learn the separation and identification of cations .
3. Understand the basic concepts Inorganic Chemistry.
4. Learn the Physical and Chemical properties of alkane, alkene and alkyne.
5. Understand the commercial and technological importance such as inks, paints, foods, polymer blends, and Nano Composite.

TEXT BOOK(S)

1. Glasstone S, Lewis D, Elements of Physical Chemistry, London, Mac Millan & Co Ltd.
2. Gopalan R, Subramanian PS, & Rengarajan K. 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. 2020. Principles of Inorganic Chemistry, 33rd edition, Vishal Publishing & Co.
5. Soni PL. Text book of Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.

REFERENCE BOOK(S)

1. Bahl BS, and Bahl A. 2010. Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.,
2. Bahl BS, Arun Bahl and Tuli GD. 2012. Essentials of Physical Chemistry, New Delhi, Sultan Chand & Sons.
3. Jerry March, 2015. Advanced Organic Chemistry, Reaction Mechanism and Structure, 7th Edition, Wiley Inter Science.
4. Lee JD. Concise Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons,
5. Morrison RT, and Boyd RN, Bhattacharjee SK. 2011. Organic Chemistry, 7th edition, Pearson India.

E-RESOURCES

1. <https://www.abebooks.co.uk> › title › author › glasstone-...
2. <https://chemistryexplainedorg.files.wordpress.com/2020/09/organic-chemistry-basic-concepts.pdf>
3. <https://www.wiley.com> › en-us › March's+Advanced+O...
4. <http://www.orderyourbooks.com> › product › principles...
5. <https://www.schandpublishing.com> › author-details ›

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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:

OBJECTIVES

- To learn the technique of titrimetric analysis.
- To describe the estimation of several cations and anions.
- To know the estimation of total hardness of water.

Titrimetric Quantitative Analysis

I Acidimetry – Alkalimetry

1. Estimation of Hydrochloric acid
2. Estimation of Sodium hydroxide
3. Estimation of Na_2CO_3

II Permanganometry

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

III Iodo and Iodimetry

6. Estimation of copper
7. Estimation of potassium permanganate

Scheme of Valuation:

Internal Marks	40 Marks
Practical Max.Marks	60 Marks
Record	10 Marks
Procedure Writing	10 Marks
Results	
<1%	40 Marks
1-2%	35 Marks
2-3%	25 Marks
3- 4%	15 Marks
>4%	10 Marks

COURSE OUTCOME

The students are able to,

1. Understand the apparatus used in volumetric analysis and correct titrimetric analysis.
2. To make solutions of various molar concentrations.
3. Understand and how to standardize solution.
4. Estimate the amount of substance present in a given solution.
5. Learn the mathematical skills doing calculation.

TEXT BOOK(S)

1. Arthur I Vogel. 2010. Elementary practical organic chemistry, second edition, Pearson education.
2. Chirag R Fultariya DR, Jalap P Harsor DR. 2017. Volumetric analysis, concepts and experiments, First edition, Lulu.Com.
3. Frederick George Mann, Bernard Charles Saunders, Practical organic chemistry, Longman London and New York.
4. Gnanapragasam NS, Ramamurthy G. 1998. Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.
5. Henry W Schimpf. 2009. A text book of volumetric analysis, Bibliolife.
6. Venkateswaran V, Veerasamy R, Kulandaivelu AR. 2006. Basic principles of Physical Chemistry, Second edition, Sultan Chand & Sons, New Delhi.

REFERENCE BOOK(S)

1. Berry AJ. 2014. Volumetric Analysis, First edition, Cambridge University press, UK.
2. Gopalan R. 2000. Elements of analytical chemistry, S. Chand, New Delhi.
3. Lalitha Pottail, Subashini Sripathi, 2017. Volumetric analysis and systematic analysis of organic compounds, First edition, Lap Lambert Academic Publishing, USA.
4. Longman. 1989. Vogel's Text Book of Quantitative Chemical Analysis, 5th edition, Engl,
5. Peter Mc Pherson. 2014. Practical volumetric analysis Royal Society of chemistry.

E-RESOURCES

1. <https://gtu.ge> > Agro-Lib > Vogels_TEXTBOOK_O...PDF
2. <https://www.bookdepository.com> > Volumetric-Analysi...
3. <https://www.sultanchandandsons.com> > book > basic-pr...
4. <https://chemistry.tcd.ie/assets/pdf/preliminary%20course/titration%20demonstration.pdf>
5. <https://www.pearsoned.co.in> > web > books > 9788131...

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(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF MICROBIOLOGY

(For B.Sc., CHEMISTRY – ALLIED BOTANY)

Semester: I-AC-I: Botany-I Plant Diversity and Physiology, Mushroom Technology
Ecology and Phytogeography

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To expose the diversity of plant kingdom and their salient features
To acquire skills for engaging themselves in self-employment especially in the broad field of Mushroom Culture.
- To explore the physiological functions of green plants
To make the students understand and appreciate the interactions between the living and non-living organisms.

UNIT I Algae, Fungi and Lichens (14 Hours)

Algae: General characteristics of algae and its importance. Structure, reproduction and life cycle of *Nostoc*, *Chlorella*, *Oedogonium*, *Ectocarpus* and *Polysiphonia*. Fungi: General characteristics of fungi and its importance. Structure of *Albugo* and *Penicillium*. Lichens: General features of Lichens and its economic importance.

UNIT II Bryophytes, Pteridophytes and Gymnosperms (8 Hours)

Bryophytes: General characteristics of bryophytes. Structure, reproduction and life cycle of *Polytrichum*. Pteridophytes: General characteristics of pteridophytes. Structure, reproduction and life cycle of *Lycopodium*. Gymnosperms: General characteristics of gymnosperms and its importance. Structure, reproduction and life cycle of *Cycas*.

UNIT – III: Plant Physiology (14 Hours)

Absorption of water. Photosynthesis – Light and dark reaction (C3 cycle only). Respiration. Plant movements, Plant Photoperiodism (LDP-SDP-DNP) and Process of Plant senescence.

UNIT – IV: Mushroom Technology (8 Hours)

Mushroom: Introduction, nutritive value and importance of mushrooms. Cultivation of Oyster mushroom - spawn preparation, preservation of mushrooms, and mushrooms recipes.

UNIT- V: Ecology and Phytogeography (16 Hours) Concept and components of Ecosystems – Abiotic and biotic ; Plant succession, physiognomy of forest, biogeochemical cycles – Water cycle, Nitrogen cycle, Oxygen cycle, Phytogeographical regions of India.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Comprehends the general features, biology and distribution of Algae, Fungi, Lichens and their economic importance.
2. Understand the link between Bryophytes, Pteridophytes and Gymnosperms and their ecological significances
3. Discover water and light as resources to perform photosynthesis and other phytochemical reactions at specific types of Ecosystem.
4. Gain a comprehensive exposure on different elements of Mushroom culture and also to develop entrepreneur skill.
5. Understand the elements of nature and its various interactions among living and non-living organisms, other resources like Forest, Water, Air and its Conservation through sustainable utilization, Moreover it helps enriches the knowledge of Civil Services Examination.

TEXT BOOK(S)

1. Alice, D., Muthusamy and Yesuraja, M. 1999. *Mushroom Culture*. Agricultural College, Research Institute Publications, Madurai.
2. Ganguly A.K. 1971. *General Botany*, Vol. I. The New Book Stall, Calcutta.
3. Jain, V.K. 1990. *Fundamentals of Plant Physiology*. S. Chand & Co., New Delhi.
4. Marimuthu, T. 1991. *Oyster Mushroom*. Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
5. Pandey, S.N. 1991. *Plant Physiology*. Vikas Publishing House (P) Ltd., New Delhi.
6. Rao K.N. Krishnamurthy K.V. and Rao G. 1979. *Ancillary Botany*. Viswanathan Pvt. Ltd., Chennai.
7. Sethi, I.K. and Walia, S.K. 2011. *Text book of Fungi & Their Allies*. MacMillan Publishers Pvt. Ltd., Delhi.

REFERENCE BOOK (S)

1. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. 1996. *Introductory Mycology* (4th edition). John Wiley and Sons (Asia), Singapore.
2. Sagwal.S.S. 1995. *Forest Ecology in India*, pointer Publishers, Jaipur -3.
3. Sharon La Bonde Hanks. 2006. *Ecology and the Biosphere principles and problems*. Pentagon Press New Delhi.
4. Suman B.C. and Sharma V.P. 1990. *Mushroom Cultivation and Uses*. Agrobios (India), Jodhpur.
5. Tripathi, D.P. 2005. *Mushroom Cultivation*. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
6. Nita Bhal 2000. *Handbook on Mushrooms Vol. I and II* (2nd Ed.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi

E- RESOURCES

1. <https://www.biologydiscussion.com/algae/algae-definition-characteristics-and-structure-with-diagram/46727>
2. <https://www.easybiologyclass.com/algae-general-characters-ppt-power-point-presentation/>
3. [https://nios.ac.in/media/documents/vocational/mushroom_production_\(revised\)\(618\)/Lesson-01.pdf](https://nios.ac.in/media/documents/vocational/mushroom_production_(revised)(618)/Lesson-01.pdf)
4. <https://vulms.vu.edu.pk/Courses/ZOO507/Downloads/ecology%20notes%20PDF.p df>
5. <https://www.ringgold.org/cms/lib/PA01916235/Centricity/Domain/228/8%20Ecology.pdf>
6. <https://www.biodiversitylibrary.org/subject/Phytogeography#/titles>

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DEPARTMENT OF MICROBIOLOGY

(For B.Sc., CHEMISTRY – ALLIED BOTANY)

Semester: I-AP-I: Botany Practical–I Plant Diversity, Plant Physiology, Mushroom
Technology, Ecology and Phytogeography

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

1. Micro preparations of algae, fungi, bryophytes, pteridophytes, gymnosperms and demonstrating their description and identity included in the syllabus.
2. Comment on simple experimental setup in plant physiology included in the syllabus.
3. Demonstration of mushroom cultivation and preparation of recipes
4. Ecology- plant adaptations/ Demonstration of hydrophytic adaptations

REFERENCE BOOK(S)

1. Pathak, V.N. and Yadav, N. 1998. Mushroom Production and Processing Technology Agrobios, Jodhpur
2. Pandey, B.P. 2001. College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.
3. Noggle, R. and Fritz .1989. Introductory Plant Physiology. Prentice Hall of India.
4. Sagwal.S.S. 1995. Forest Ecology in India, pointer Publishers, Jaipur -3.

E- RESOURCES

1. <https://soe.unipune.ac.in/studymaterial/pritiJadhavOnline/Algae,%20Bryo,%20Pterido.pdf>
2. <http://www.esalq.usp.br/lepse/imgs/conteudo/Plant-Physiology-by-Vince-Ordog.pdf>
3. <http://www.zpd7icar.nic.in/download/Mushroom%20Training%20Manual.pdf>
4. https://agricoop.nic.in/sites/default/files/ICAR_8.pdf
5. https://link.springer.com/chapter/10.1007/978-1-349-08226-1_1
6. <http://www.unm.edu/~jdelong/Ecology%20310%20Lab%20Chapter%202.pdf>
7. <http://www.freebookcentre.net/Biology/Ecology-Books.html>
8. https://bsi.gov.in/uploads/documents/Public_Information/publication/books/flora_of_India/Flora%20of%20India%20Introductory%20I.pdf

SEMESTER II

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: II-CC-II: General Chemistry-II

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:

OBJECTIVES

1. To describe the principles and theories of chemical bonding.
2. To understand the chemistry of S-block elements and metallurgy of zero group elements
3. To discuss about the properties of atoms, characteristics, effect of radiations and the significance of wave functions.

UNIT- I: Chemical Bonding

(17 Hours)

Ionic bond formation, variable electro valency – Lattice energy, Born – Haber Cycle. Covalent bond formation-variable covalency-maximum covalency- covalent character in ionic bond – Fajan's Rule-Polarization – Partial ionic character of a covalent bond- VB theory-MO theory – Basic principles of bonding and antibonding orbitals- applications of MOT to H₂, O₂ - Comparison of VB & MO Theories-Hybridization – Formation of Be Cl₂- VSEPR theory of simple inorganic molecules –PCl₅, SF₆, IF₇, Xe F₆, BF₃

UNIT –II: Chemistry of S-Block & Zero Group Elements and Metallurgy

(19 Hours)

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. Metallurgy: Occurrence of metals – concentration of ores – froth floatation-magnetic separation,-calcination, roasting, smelting, flux, alumino thermic process-purification of metals – electrolysis, zone refining, van Arkle de-Boer process Zero group elements – position in the periodic table- occurrence- isolation, applications

UNIT III Chemistry of Benzene and Benzenoid Compounds

(19 Hours)

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

UNIT IV Chemistry of Polymers

(16 Hours)

Basics of Polymers –monomer, polymer definition - classification of polymer on the basis of structure- source of availability, and molecular forces – Types of polymerization reaction - addition – condensation- copolymerization- Ziegler -Natta catalyst and polymerization- Mechanisms of Free radical and ionic polymerization reactions-Basics of rubber-Chemistry of Vulcanization of rubber – uses- Chemistry of manufacture of PVC- Polyethene - Teflon-Rayon and Polycyclic fibers – its uses. Molecular weight of macromolecules- determination of molecular weight by osmotic pressure and light scattering methods.

UNIT V Atomic Structure and Basic Quantum Mechanics**(19 Hours)**

Rutherford's and Bohr's model an atom- Bohr's theory and origin of hydrogen spectrum. Sommerfeld's extension of Bohr's theory-Electromagnetic radiation- definitions for λ , ν and velocity-Dualism of light - Particle nature of radiation- black body radiation and Planck's quantum theory- photoelectric effect and Compton effect of matter-De Broglie hypothesis and Heisenberg's uncertainty principle- Schrodinger wave equation (Derivation not needed). Physical significance of Ψ and Ψ^2 .

Total Lecture Hours- 90**COURSE OUTCOME**

The students are able to,

1. Understand the common themes running through ionic, covalent and metallic descriptions of chemical bonding.
2. Learn how chemical substances can be described in terms of structure and bond type.
3. Understand the general trends in the periodic table of elements and recall the structures, the properties applications and chemical reactivity of elements.
4. Learn how the properties of polymeric materials can be used by a product designer.
5. Describe the structure of atom and basic principles of quantum mechanism.

TEXT BOOK(S)

1. Arora MG. 2003. Chemistry of s block elements, Ammol Publisher, Bangaluru.
2. Aruldas G. 2008. Quantum mechanics, second edition, Prentice Hall India.
3. Gowariker VR, Viswanathan NV, Jayadev Sreedhar. 2019. Polymer Science, Third edition, New Age International Publisher. New Delhi.
4. Mark J Winter. 2016. Chemical bonding, Oup Oxford, England.
5. Muriel Tomlinson, 2016. An Introduction to the benzenoid compounds, first edition, Pergamon, Oxford.

REFERENCE BOOK(S)

1. Bahl BS, and Bahl A. 2010. Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.,
2. Bahl BS, Arun Bahl and Tuli GD. 2012. Essentials of Physical Chemistry, New Delhi. Sultan Chand and Sons.
3. Lee JD. 2000. Concise Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.
4. Jerry March, 2013. Advanced Organic Chemistry, Reaction Mechanism and Structure, 7th Edition, Wiley Inter Science .
5. Morrison RT, Boyd RN, Bhattacharjee SK. 2011. Organic Chemistry, 7th edition, Pearson India.

E-RESOURCES

1. https://edurev.in/studytube/ncert-textbook-chemical-bonding-and-molecular-stru/967747d5-74dd-4166-8af3-6796f5c17308_p
2. <https://www.osti.gov/biblio/4008031>
3. <https://www.britannica.com/science/benzenoid-aromatic-compound>
4. <https://byjus.com/jee/polymers/>
5. <https://www.cambridge.org/core/books/atomic-and-electronic-structure-of-solids/1b7e5043be2b6d12c749ab9a1e913295>
6. https://www.worldscientific.com/doi/abs/10.1142/9789814439367_0003
7. <https://www.wiley.com › en-us › March's+Advanced+O...>
8. <https://www.abebooks.co.uk › title › author › glasstone-...>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

OBJECTIVES

1. To learn the methods of different inorganic and organic compounds preparation and analysis.
2. To gain experience to predict the functional group transformations
3. The general concept of the practical part of this course is to train students the fundamental laboratory skills.

Organic Preparation:

Preparation of organic compounds involving the following chemical conversion.

1. Toluene to benzoic acid (oxidation)
2. Hydrolysis
Methyl Salicylate to Salicylic Acid,
Ethyl Benzoate to Benzoic Acid
3. Preparation of β Naphthyl benzoate (Benzoylation)

Inorganic Preparation:

1. Tris (thiourea) Copper I chloride
2. Tetraamine Copper (II) sulphate
3. Potassium trioxalato chromate (III)

Scheme of evaluation:

Practical External	- 60 Marks	Internal :	40 Marks
I Organic preparation	- 25 Marks		
Crude Sample	- 15 Marks		
Recrystallized Sample	- 10 Marks		
II Inorganic preparation	- 25 Marks		
Crude Sample	- 15 Marks		
Recrystallized Sample	- 10 Marks		
III Record	- 10 Marks		

COURSE OUTCOME

The students are able to,

1. Know key concepts of inorganic and organometallic chemistry including those related to synthesis, reaction chemistry, and structure and bonding.
2. Learn the basic and advanced laboratory procedures used in inorganic synthesis including spectroscopic and analytical techniques for identification and characterization of small molecules.
3. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.
4. Understand the concept of crystallization.
5. Understand how to prepare the new compounds.

TEXT BOOK(S)

1. Arthur I Vogel. 2010. Elementary practical organic chemistry, second edition, Pearson education.
2. Basavarajaiiah Nagesh GY, Ramakrishna Reddy. 2021. Compendious practical organic chemistry, Notion Press.
3. Frederick George Mann, Bernard Charles Saunders. Practical organic chemistry, Longman London and New York.
4. Gnanapragasam NS, Ramamurthy G. 1998. Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.
5. Venkateswaran V, Veerasamy R, Kulandaivelu AR. 2006. Basic principles of Physical Chemistry, Second edition, Sultan Chand & Sons, New Delhi,

REFERENCE BOOK(S)

1. Hugo Erdmann, Frederick levy Dunlap. 2015. Introduction to chemical preparations, A Guide in the practical teaching of inorganic chemistry, Sagwan press.
2. John Leonard, Barry Lygo, Garry Procter. 1994. Advanced Practical Organic Chemistry, Second Edition, revised. CRC Press.
3. Venkateswaran V, Veeraswamy R, Kulandaively AR. 1997. Basic Principles of Practical Chemistry , 2nd edition , Sultan Chand & sons, New Delhi.
4. Vogel AI. 2000. Textbook of Quantitative Inorganic Analysis, 6th Ed., Longman, New Delhi.
5. Vogel. 2011. Textbook of practical organic chemistry, 5th edition.

E-RESOURCES

1. <http://www.orgsyn.org/>
2. <https://www.philoid.com/epub/ncert/12/321/lelm109>
3. <https://www.inorganicventures.com/sample-preparation-guide>
4. <https://gtu.ge> > Agro-Lib > Vogels_TEXTBOOK_O...PDF
5. <https://www.sultanchandandsons.com> > book > basic-pr...
6. <http://chemistry-chemists.com> > Praktikum > MannPDF
7. <https://www.abebooks.co.uk> > plp

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF MICROBIOLOGY

(For B.Sc., CHEMISTRY- ALLIED BOTANY)

Semester: II-AC-II: Botany-II Morphology, Taxonomy, Anatomy,
Embryology and Horticulture

Ins. Hrs./Week : 4

Course Credit: 3

Course Code:

OBJECTIVES

- To make the students aware of basic concepts in morphology, taxonomy, anatomy and embryology.
- To help students for acquiring skills to engage themselves in self-employment through horticulture and Organic farming.

UNIT I Morphology

(8 Hours)

Phyllotaxy, Inflorescence types - racemose, cymose, and mixed – special types, cyathium, hypanthodium, verticillaster and thyrus. Technical description of flower and floral diagram.

UNIT II Plant Taxonomy

(24 Hours)

General outline of Bentham and Hooker's system of classification. Study of the range of characters and economic importance of Polypetalae - Annonaceae, Rutaceae, Myrtaceae and Cucurbitaceae. Gamopetalae - Rubiaceae, Sapotaceae and Solanaceae, Monochlamydeae - Euphorbiaceae, Monocots – Arecaceae and Poaceae.

UNIT III Plant Anatomy

(8 Hours)

Tissues – simple and complex. Primary structure of dicot stem, root and leaf. Secondary thickening in dicot stem.

UNIT IV Embryology

(8 Hours)

Structure of mature anther, pollen grain, development of male gametophyte, structure of mature ovule, development of female gametophyte (*Polygonum* type only), and fertilization.

UNIT V Horticulture

(12 Hours)

Horticulture: scope and importance, propagation methods – cutting, layering and grafting techniques, gardening-medicinal garden and irrigation methods, manures, Organic farming, Ikebana.

Total Lecture Hours– 60

COURSE OUTCOME

The students will be able to,

1. Understand and appreciate the various structures of a plant through learning the floral morphology.
2. Comprehends the botanical history by learning the classification of plants through ages.
3. Understand and appreciate the architectural marvel of green plants and to explore the various tissues and water, food conducting mechanisms.
4. Realize the most fascinating structure of reproduction in green plants and also the process of pollination and fertilization changes.
5. Develop ability to raise plant propagules through various horticulture methods and moving towards the entrepreneur skill.

TEXT BOOK(S)

1. Bhojwani, S.S. and Bhatnagar, S.P. 2000.

The Embryology of Angiosperms

th

- (4 Edition). Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
2. Bose, T.K. and Mukherjee, D. 1972. *Gardening in India*. Oxford & IBH Publishing Co., Kolkatta.
- nd
3. Esau K. 1980. *Plant Anatomy* (2 Edition) Wiley Eastern Ltd., Madras.
4. Ganguly A.K. 1971. *General Botany*, Vol.I. The New Book Stall, Calcutta.
5. Jitendra Singh. 2014. *Basic Horticulture*. Kalyani Publishers, Chennai.
6. Lawrence, G.H.M. 1955. *An Introduction to Plant Taxonomy*. The Central Book Depot, Allahabad.
7. Naik, K.C. 1963. *South Indian Fruits and Their Culture*. Vardhachary & Co., Madras.
- th
8. Naik, V.N. 1996. *Taxonomy of Angiosperms* (9 Ed.). Tata McGraw-Hill Publishing Co., (P) Ltd., New Delhi.
9. Narayanaswamy, R.V. and Rao, K.N. 1976. *Outlines of Botany*. S. Viswanathan Printers & Publishers, Chennai.
10. Pandey, B.P. 1997. *Taxonomy of Angiosperms*. S. Chand & Company Pvt. Ltd., New Delhi.
11. Ramaswami, S.N., Lakshminarayana, S. and Venkateswaralu, V. 1976. *Taxonomy (Systematic Botany) for Degree Course*. Maruthi Book Depot, Guntur, Hyderabad.
12. Rao K.N. Krishnamurthy K.V. and Rao. G. 1979. *Ancillary Botany*. S. Viswanathan Printers & Publishers, Chennai.
13. Sundararajan, J.S., Muthuswamy, J., Shanmugavelu, K.G. and Balakrishnan, R. *A Guide to Horticulture*. Thiruvengadam Printers, Coimbatore.
14. Vashista, P.C. 1997. *Taxonomy of Angiosperms*. S. Chand & Company Pvt. Ltd., New Delhi.
15. Vashista, P.C. 1977. *A Text Book of Plant Anatomy*. S. Nagin and Co., New Delhi.

REFERENCE BOOK(S)

1. Edmond, J.B., Musser, A.M. and Andrews, F.S. 1951. *Fundamentals of Horticulture*. McGraw-Hill Book Company, Inc., New York.
2. Johri, B.M. 1982. *Experimental Embryology of Vascular Plants*. Springer – Verlag, Heidelberg
3. Maheswari, P. 1985. *An Introduction to the Embryology of Angiosperms*. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Mitra, J.N. 1964. *An Introduction to Systematic Botany & Ecology*. The World Press (P) Ltd., Calcutta

E-RESOURCES

1. <https://www.clearitmedical.com/2019/06/biology-notes-morphology-of-flowering-plants.html>
2. <https://thebiologynotes.com/plant-taxonomy/>
3. <https://www.biologydiscussion.com/plant-taxonomy/plant-taxonomy-history-classification-and-plant-kingdom/41749>
4. <https://forestrypedia.com/classification-of-plant-kingdom/>
5. <https://www.easybiologyclass.com/plant-anatomy-online-tutorials-lecture-notes-study-materials/>
6. <https://uou.ac.in/sites/default/files/slm/BSCBO-202.pdf>
7. <https://www.agrimoon.com/wp-content/uploads/Fundamentals-of-Horticulture.pdf>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF MICROBIOLOGY

(For B.Sc., CHEMISTRY – ALLIED BOTANY)

Semester: I-AP-II: Botany Practical –II Botany Practical –II Morphology, Taxonomy, Anatomy, Embryology and Horticulture

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

1. To dissect the flower and to construct the floral diagram
2. Description of the plants and salient features of the families included in the syllabus
3. Micro preparations of stem, root and leaf of dicot and their identification.
4. Micro preparation of anther and observation of ovules (permanent slides).
5. Propagation techniques, Horticultural implements/tools/Organic fertilizers/ Ikebana

REFERENCE BOOK(S)

1. Foster, A.S. 1960. *Practical Plant Anatomy*. Van Nostrand and East–West Press New Delhi
2. Gurcharan Singh . 1999. *Plant Systematics - Theory & Practice*. Oxford & IBH Publishing Co. (P) Ltd., NewDelhi.
3. Kumar, N. 1997. *Introduction to Horticulture*. Rajalakshmi Publications, Nagercoil
4. LexLauries and Victor, H.R. 1950. *Floriculture – Fundamental and Practices*. McGraw Hill Publishers, New York.
5. Pandey, B.P. 1997. *Taxonomy of Angiosperms*. S. Chand & Company Pvt. Ltd., NewDelhi.
6. Randhawa, G.C. 1973. *Ornamental Horticulture in India*. Today & Tomorrow Publishers, New Delhi.
7. Rogland, A. 2000. *Developmental Botany (Embryology of Angiosperms)*. Saras Publications, Nagercoil.
8. Santra, S.C, Chatterjee and A.P. Das .2001. *College Botany Practical Vol.II* ,New central book agency(p) Ltd., Kolkata.
9. Subramaniam, N.S. 1999. *Laboratory Manual of Plant Taxonomy* (2 Ed.). Tata McGraw-Hill Publishing Co., NewDelhi.

E- RESOURCES

1. <https://www.clearitmedical.com/2019/06/biology-notes-morphology-of-flowering-plants.html>
2. <https://thebiologynotes.com/plant-taxonomy/>
3. <https://www.biologydiscussion.com/plant-taxonomy/plant-taxonomy-history-classification-and-plant-kingdom/41749>
4. <https://forestrypedia.com/classification-of-plant-kingdom/>
5. <https://www.easybiologyclass.com/plant-anatomy-online-tutorials-lecture-notes-study-materials/>
6. <https://uou.ac.in/sites/default/files/slm/BSCBO-202.pdf>
7. <https://www.agrimoon.com/wp-content/uploads/Fundamentals-of-Horticulture.pdf>

ALLIED CHEMISTRY

SEMESTER I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

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

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To understand the various Preparation of drugs and chemical compounds.
- To study the various concepts of resonance and halogen compounds.
- To study the properties of aromatic compounds and organic reactions.

UNIT I Industrial Chemistry

(11 Hours)

Industrial Chemistry: Fuel gases – Water gas- producer gas- LPG gas-Gobar gas and natural gas. 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 Compound

(13 Hours)

Polar effects: Inductive effect – 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

(13 Hours)

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 (12 Hours)

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, phase rule definitions - one component system– water system

UNIT V Chemical Equilibrium and Chemical Kinetics Reactions

(11 Hours)

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

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

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Study the preparation of some drugs.
2. Learn the concepts of resonance and halogen compounds are known.
3. Learn Aromatic compounds and organic reactions.
4. Understand the concepts of solid state chemistry.
5. Understand the principle of kinetics.

TEXT BOOK(S)

1. Biswas AK. 1989. Frontiers in Applied Chemistry, Narosa publishing house.
2. James A Andley. 2018. Industrial Chemistry, 9th edition, John Wiley publishers.
3. James A Kent. 2017. Riegel's Handbook of Industrial Chemistry, 9th edition, S.Chand Publishers.
4. Nafis S. 2019. Organic chemistry, 11th edition, S.Chand Publishers.
5. Thangamma Jacob, Macmillian. 1990. Textbook of Applied Chemistry, India Ltd. Mumbai.

REFERENCE BOOK(S)

1. Geralad. H. Hollack, 2013. Fourth phase of water, Pearson publishers.
2. Gopalan R. 2012, Text Book of Inorganic Chemistry, 2nd Edition, Hyderabad, Universities Press, India.
3. Morrison R.T. and Boyd R.N. Bhattacharjee S.K. 2011. Organic Chemistry 7th edition, Pearson India.
4. Puri BR. Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, 35th edition, Shoban Lal Nagin Chand and Co New Delhi.
5. Soni PL, Chanurel HM. 2012. A Text book of Organic Chemistry, S. Chand Publishers.

E-RESOURCES

1. <https://www.internetchemistry.com/chemistry/industrial-chemistry.php>
2. <https://brilliant.org/wiki/inductive-effect-electromeric-effect-resonance/>
3. <https://www.numerade.com/books/chapter/reactions-of-aromatic-compounds-3/>
4. <https://www.chemie-biologie.uni-siegen.de/ac/lehre/lecture1.pdf>.
5. <https://elearning.stpauls.ac.in/course/chemical-kinetics/>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)
SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

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

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- To determine the concentration of solution To
- learn the technique of titrimetric analysis.
- To describe the estimation of several cations and anions.

I. Acidimetry and alkalimetry

- Strong acid VS strong base
- Weak acid VS strong base
- Determination of hardness of water

II. Permanganometry

- Estimation of ferrous sulphate
- Estimation of oxalic acid

III. Iodometry

- Estimation of potassium dichromate
- Estimation of potassium permanganate

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 students will be able to,

1. Evaluate the principle of redox chemistry in intercalation reactions
2. Facilitate the learner to make solutions of various molar concentrations.
3. Standardize various solutions
4. Estimate the amount of substance present in a given solution.
5. Utilize the mathematical skills doing calculation.

TEXT BOOK(S)

1. Arthur I Vogel. 2010. Elementary Practical Organic Chemistry (second edition), Pearson education.
2. Chirag R Fultariya DR, Jalap P Harsor DR, 2017, Volumetric Analysis, Concepts and Experiments, First edition, Lulu.Com.
3. Frederick George Mann, Bernard Charles Saunders. Practical Organic Chemistry, Longman London and New York.
4. Gnanapragasam NS, Ramamurthy G. 1998. Organic Chemistry Lab Manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.
5. Henry W Schimpf. 2009. A Text book of Volumetric Analysis, Bibliolife.
6. Venkateswaran V, Veerasamy R, Kulandaivelu AR. 2006. Basic Principles of Physical Chemistry, Second edition, Sultan Chand & Sons, New Delhi.

REFERENCE BOOK(S)

1. Berry AJ. 2014. Volumetric Analysis (First edition), Cambridge University press, UK.
2. Gopalan R. 2000. Elements of Analytical Chemistry, S. Chand, New Delhi.
3. Lalitha Pottail and Subashini Sripathi. 2017. V Pubishing Volumetric Analysis and Systematic Analysis of Organic Compounds, First edition, Lap Lambert Academic Pubishing, USA.
4. Longman 1989. Vogel's Text Book of Quantitative Chemical Analysis, 5th edition, Engl.
5. Peter McPherson. 2014. Practical Volumetric Analysis, Royal Society of chemistry.

E-RESOURCES

1. http://www.veerashaivacollege.org/images/pdf/study_material/volumetric_analysis.pdf.
2. <https://byjus.com/chemistry/volumetric-analysis/>
3. <http://www.wiredchemist.com/chemistry/instructional/laboratory-tutorials/volumetric-analysis>.
4. https://fac.ksu.edu.sa/sites/default/files/unit_6_introduction_to_volumetric_analysis_-_subjects_0.pdf
5. <https://alevelchemistry.co.uk/notes/techniques-volumetric-analysis/>

SEMESTER II

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

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

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:

OBJECTIVES

- To learn the basics of nuclear chemistry.
To understand the properties and applications of carbohydrates, amino acids and proteins.
- To study the basic concepts of polymers, heterocyclic compounds.

UNIT I Nuclear Chemistry

(12 Hours)

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

(12 Hours)

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), Zwitter ion, Isoelectric point.

UNIT III Heterocyclic compounds, Vitamins and Drugs

(12 Hours)

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

(12 Hours)

Surface Chemistry: Introduction to surface chemistry absorption, adsorption physisorption- chemisorption –Difference between physisorption and chemisorption. b.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

(12 Hours)

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.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Know the applications of physical, inorganic and organic chemistry towards biological systems.
2. Recognize and predict the structure and reactivity of biologically important organic molecules
3. Explain the synthesis of biologically important organic molecules and their role in metabolic pathways
4. Understand the building blocks of both DNA and RNA, secondary structures, tertiary structures.
5. Understand Heterocyclic compounds and separation techniques

TEXT BOOK(S)

1. Brian Wardle. 2019. Principles and Applications of Photochemistry, 4th edition, John Publishers.
2. Jain JL. 2017. Elementary Bio-Chemistry, 2nd Revised edition, S.Chand & Company.
3. James M Miller. 2019. Chromatography Contrast and Concept, 5th edition, Wiley publishers.
4. Raj K Pansal. 2017. Heterocyclic Compounds, 5th edition, New Age publishers.
5. Sathyanarayana U. 2019. Essentials of Bio-Chemistry, 3rd edition, Books & Allied Pvt. Ltd.

REFERENCE BOOK(S)

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, 8th Edition, New Age Publications, New Delhi.
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, Highmount Publishing house, 14th Edition, (Both in Tamil and English) Chennai.

E-RESOURCES

1. <https://teachchemistry.org/classroom-resources/topics/nuclear-chemistry>
2. <https://www.askiitians.com/iit-jee-carbohydrates-amino-acids-peptides/carbohydrates/>
3. https://application.wiley-vch.de/books/sample/3527332014_c01.pdf
4. <https://www.mdpi.com/2571-9637/3/3/33/pdf>
5. http://ccamp.res.in/sites/default/files/basics%2520of%2520chromatography_kr_c-camp.pdf

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2022)
DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: II-AP-II: Allied Chemistry Practical-II

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

OBJECTIVES

- The course is to give an introduction of fundamental methods and procedures used in the synthesis of organic compounds at micro and semi-microscale.
- Experimental laboratory work with modern synthetic reactions will illustrate the importance of organic chemistry for our society.
- To identify, classify, analyze organic molecules

Organic Qualitative 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	15marks
Functional group identification Correctly	10 marks
Confirmative test	10 marks
Record	10 marks

COURSE OUTCOME

The students will be able to,

1. Know the practical knowledge in the synthesis of organic compounds on lab scale.
2. Explain the common organic reactions.
3. Analyze various organic compounds using documented procedures.
4. Classify organic compounds based on functional groups.
5. Distinguish the reactions of various functional groups.

TEXT BOOK(S)

1. Arthur I Vogel. 2010. Elementary Practical Organic Chemistry second edition, Pearson education.
2. Chirag R Fultariya, DR. Jalap P Harsor. 2017. Volumetric analysis, Concepts and Experiments, First edition, Lulu.Com
3. Frederick George Mann, Bernard Charles Saunders. Practical Organic Chemistry, Longman London and New York.
4. Gnanapragasam NS and Ramamurthy G. 1998. Organic Chemistry Lab Manual, S. Viswanathan and Co. Pvt. Ltd. Chennai.
5. Henry W. Schimpf. 2009. A Text book of Volumetric Analysis, Bibliolife.
6. Venkateswaran V, Veerasamy R, Kulandaivelu AR. 2006. Basic Principles of Physical Chemistry, Second edition, Sultan Chand & Sons, New Delhi.

REFERENCE BOOK(S)

1. Ahluwalia, Sunita Dhingrs VK. 2000. Comprehensive Practical Organic Chemistry University Press.
2. Gopalan R. 2000. Elements of Analytical Chemistry, S. Chand, New Delhi,
3. Satinder K Juneja, Aran Kumar. 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, Prentic Hall.

E-RESOURCES

1. <https://www.coursehero.com/file/161395/qualitative-analysis-of-organic-compounds/>
2. http://community.wvu.edu/~josbour1/labs/s2017/exp%252024%2520-%2520qoa_2017.pdf
3. http://wwwchem.uwimona.edu.jm/lab_manuals/c10expt25.html
4. <https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysis-of-organic-compounds/>
5. https://www.csub.edu/chemistry/organic/manual/lab14_qualitativeanalysis.pdf
