

**SENGAMALATHAYAAREEDUCATIONALTRUSTWOMEN'SCOLLEGE
(AUTONOMOUS)**



(Affiliated to Bharathidasan University)
(Accredited by NAAC; An ISO9001:2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI-614016.
TAMILNADU, INDIA.

B.Sc., CHEMISTRY
COURSE STRUCTURE WITH SYLLABUS UNDER CBCS
(For the candidates admitted in the academic year 2021-2024)



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TAMILNADU, INDIA.

B.Sc., CHEMISTRY COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2021-2024)

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	21LC101	6	3	3	25	75	100
	II	English Language Course(ELC)-I	Prose and Communication Skills	21ELC101	6	3	3	25	75	100
	III	Core Course (CC)-I	General Chemistry – I	21CH101	6	5	3	25	75	100
		Core Practical(CP)-I	Volumetric Analysis(P)	21CH102P	3	3	3	40	60	100
		Allied Course (AC)-I	Mathematics - I Calculus / Botany – I	21AMM101 /21ABO101	4	3	3	25	75	100
	Allied Practical(AP)-I	Mathematics – II Algebra & Analytical Geometry 3D/ Botany (PI)	21AMM102/ 21AB0102P	3	2	3	25	75	100	
				3	2	3	40	60	100	
IV	Value Education	Value Education	21UGVED	2	2	3	25	75	100	
TOTAL					30	21	-	-	-	700
II	I	Language Course (LC) –II-Tamil*/Other Languages**#	Idaikkala Ilakkiyamum Pudhinamum	21LC201	6	3	3	25	75	100
	II	English Language Course(ELC) -II	Poetry and Communication Skills	21ELC201	6	3	3	25	75	100
	III	Core Course (CC)-II	General Chemistry - II	21CH203	6	5	3	25	75	100
		Core Practical(CP) -II	Organic & Inorganic Preparation (P)	21CH204P	3	3	3	40	60	100
		Allied Course (AC)-II	Mathematics-III Trigonometry & Fourier series / Botany (PII)	21AMM203/ 21ABO203P	3	2	3	25	75	100
				3	2	3	40	60	100	
Allied Practical(AP)-II	Mathematics - IV ODE, PDE and Laplace Transforms / Botany -II	21AMM204/ 21ABO204	4	3	3	25	75	100		
IV	Environmental Studies	Environmental Studies	21UGCES	2	2	3	25	75	100	
TOTAL					30	21	-	-	-	700
III	I	Language Course (LC) – III Tamil*/Other Languages**#	Kaapiyamum Naadakamum	21LC301	6	3	3	25	75	100
	II	English Language Course(ELC)-III	Language through Literature III (Drama and Communication Skills)	21ELC301	6	3	3	25	75	100
	III	Core Course(CC)-III	General Chemistry - III	21CH305	6	5	3	25	75	100
		Core Practical (CP)-III	Organic Analysis (P)	21CH306P21	3	3	3	40	60	100
		Allied Course(AC)-III	Allied Physics- I	21APY301	4	3	3	25	75	100
Allied Practical(AP)-III	Allied Physics Practical - I	21APY302P	3	2	3	40	60	100		

Sem.	Part	Nature of the Course	Title of the Course	Course Code	Inst.Hours/Week	Credit	Exam Hours	Marks		Total
								CIA	ESE	
	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 upto +2 but opt for other languages in degree programme	Non Major Elective I- for those who studied Tamil under Part-I a) 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
	I	Language Course (LC)-IV-Tamil*/Other Languages**#	Pandaiya Ilakkiyam	21LC401	6	3	3	25	75	100
	II	English Language Course(ELC)-IV	Language through Literature IV (Short stories And Communication Skills)	21ELC401	6	3	3	25	75	100
IV	III	Core Course(CC)-IV	General Chemistry – IV	21CH407	4	4	3	25	75	100
		Core Practical (CP)-IV	Semi micro Analysis(P)	21CH408P	3	3	3	40	60	100
		Allied Course(AC)-IV	Allied Physics -II	21APY403	4	3	3	25	75	100
		Allied Practical(AP)-IV	Allied Physics Practical-II	21APY302P	3	2	3	40	60	100
	IV	Non Major Elective(NME)-II –for those who studied Tamil under Part I a). Basic Tamil for other language students b). Special Tamil for those who studied Tamil upto+2but opt for other languages in degree programme	Non Major Elective II- 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 +2 but opt for other languages in degree programme	-	2	2	3	25	75	100
		Skill Based Elective(SBE)-I	-	21SBECH1	2	2	3	25	75	100
		TOTAL			30	22	-	-	-	800
V	III	Core Course (CC)-V	Inorganic Chemistry	21CH509	5	5	3	25	75	100
		Core Course(CC)-VI	Organic Chemistry – I	21CH510	5	5	3	25	75	100
		Core Course (CC)-VII	Physical Chemistry – I	21CH511	6	5	3	25	75	100
		Core Practical(CP)-V	Physical Chemistry Practical	21CH512P	3	3	3	40	60	100
		Major Based Elective(MBE)-I	Material & Nano Chemistry / Analytical Chemistry	21MBECH1:1/ 21MBECH1:2	5	4	3	25	75	100
	IV	Skill Based Elective(SBE)- II	-	21SBECH2	2	2	3	25	75	100
		Skill Based n Elective(SBE)- III	-	21SBECH3	2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development	21UGSDC	2	2	3	25	75	100
		TOTAL			30	28	-	-	-	800
VI	III	Core Course (CC)-VIII	Organic Chemistry –II	21CH613	6	6	3	25	75	100
		Core Course (CC)-IX	Physical Chemistry –II	21CH614	6	6	3	25	75	100
		Core Practical(CP)-VI	Gravimetric Analysis (P)	21CH615P	5	3	3	40	60	100
		Major Based Elective(MBE)-II	Nuclear, Industrial Chemistry & metallic state / Solid State Chemistry	21MBECH2:1/ 21MBECH2:2	6	5	3	25	75	100
		Core Course (CC)-X	Group Project	21CHPW	6	6	3	25	75	100
	V	Extension Activities	**Extension Activities-Gender Studies		1	1	3	25	75	100
		Gender Studies	-	21UGGS						
		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 up to 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 pass in minimums prescribed for CIA and ESE		

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for ESE shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

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

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Title of the Paper
III		NME – I	Agricultural Chemistry
IV		NME- II	Health Chemistry

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

Semester	Part	Course	Title of the Paper
IV		SBE – I	Chemistry of Milk and Milk Products
V		SBE – II	Textile Chemistry
VI		SBE – III	Polymer Chemistry

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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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

Ins. Hrs./Week: 6 **Semester: I-CC-I: General Chemistry-I** **Course Credit: 5** **Course Code:21CH101**

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 Periodic Properties (19 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 of electronegativity - Classification of elements into s, p, d and f block elements.

UNIT II Principles of Wet Chemical Analysis and Acid-Base Theory (19 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 Theories 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)

UNIT III Basic Concepts in Organic Chemistry (19 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, electromeric, resonance and hyper conjugative effects -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 (17 Hours)

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

Alkenes: Nomenclature – Petroleum source of alkenes – General methods of preparation of alkenes – Physical ,Chemical properties – Markovnikov's rule and Saytezzff rule - Peroxide effect-Uses.

Characteristics of nucleophilic, electrophilic and free radical reactions- Reaction mechanism - Elimination reaction (E_1 & E_2) -Hoffman elimination.

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

UNIT V Colloids and Macromolecules

(16 Hours)

Definition and types of Colloids – preparation – Purification (dialysis), Electrodialysis (Ultra filtration) and stability of colloids – gold number-Properties of colloids – kinetic, optical and electrical properties.

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

Student will be able to

1. Students be able to predict how chemicals will behave
2. Understand the apparatus used in volumetric analysis and correct titrimetric procedure
3. Students should be able to identify common acids and bases and ways of testing them
4. Students should be able to recognize many functional groups and describe bonding models and appreciate how these impact on the properties of a simple molecule
5. Students should be able to understand the commercial and technological importance such as inks, paints, foods, polymer blends, and Nano Composites
6. Get idea behind the structure and bond type of simple inorganic molecules

TEXT BOOKS

1. Glasstone S, Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co Ltd.
2. Gopalan R, Subramanian PS, Rengarajan 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, ShobanLalNagin Chand & Co.,
5. Puri BR, Sharma LR, Pathania MS. 2013. Principles of Physical Chemistry, 35th edition, New Delhi: Shoban LalNaginchand and Co.
6. Soni PL. 2000. Text book of Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.

REFERENCES

1. Bahl BS, 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 Son
3. Jerry March. 2013. Advanced Organic Chemistry, Reaction, Mechanism and Structure, 7th Edition, Wiley Inter Science.
4. Lee JD. 2000. Concise Inorganic Chemistry', 20th revised edition, Sultan Chand & Sons.
5. Morrison RT, Boyd RN, Bhattacharjee SK. 2011. Organic Chemistry, 7th edition, Pearson India.

E –RESOURCES

1. www.goodreads.com
2. www.springer.com
3. www.pdfdrive.com
4. www.elsevier.com
5. www.taylorfrancis.com
6. www.booktopiya.com

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:21CH102P

OBJECTIVES

- To learn the technique of titrimetric analysis.
- To know 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

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

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

1. Understand the apparatus used in volumetric analysis and correct titrimetric Analysis
2. Calculate the estimation of total hardness of water
3. Evaluate the estimation of titrimetric analysis.

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. 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. www.ebooksread.com
2. www.topfreebooks.org
3. www.worldcat.org
4. www.freebookcentre.net

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 4

Course Credit: 3

Course Code:21ABO101

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

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

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

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

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

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.

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

E- RESOURCES

1. <https://doi.org/10.3108/beej.14.1>
2. <https://doi.org/10.1152/advan.00007.2017>
3. <https://www.jstor.org/stable/40555946>

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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:21ABO102P

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

E- RESOURCES

1. <https://doi.org/10.1080/17550874.2018.1540021>

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DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – I

(For Physics & Chemistry)

Semester : I – AC – I : Calculus

Ins. Hrs. /Week : 4

Course Credit: 3

Course Code :21AMM101

OBJECTIVES

- To learn the basic need for their major concepts
- To train the students in the basic Integrations
- To introduce the notion of Curvature, Radius and Centre of curvature

UNIT I Successive Differentiation

Introduction - Successive Differentiation – Definition with Examples - n^{th} derivative of standard functions (Derivation not needed) - Leibnitz Theorem (proof not needed) and its applications - Simple problems in all these.

UNIT – II: Curvature

Total differential coefficients (proof not needed) – Definition - Curvature and Radius of curvature in Cartesian only (proof not needed) – Centre of curvature (proof not needed) – Definition with Examples - Related problems in all these.

UNIT – III: Evaluation of Integrals

Evaluation of Integrals of types

- 1) $\int \frac{1}{\sqrt{a^2 - x^2}}$ 2) $\int \frac{1}{\sqrt{x^2 + a^2}}$ 3) $\int \frac{1}{(x + a)\sqrt{x^2 + a^2}}$
 4) $\int \frac{1}{\sqrt{a^2 + x^2}}$ 5) $\int \frac{1}{\sqrt{x^2 - a^2}}$

Integration by trigonometric substitution

- 1) $\int \sqrt{a^2 - x^2}$ 2) $\int \sqrt{x^2 + a^2}$ 3) $\int \sqrt{x^2 - a^2}$

UNIT – IV: Reduction Formula

General Properties of Definite Integrals - Integration by Parts.

Reduction Formula (when n is a positive integer) for

- 1) $\int x^n e^x$ 2) $\int x^n \sin x$ 3) $\int x^n \cos x$
 4) $\int x^n \ln x$ 5) $\int x^n \tan^{-1} x$ 6) $\int x^n \cot^{-1} x$

7) Without proof $\int \frac{1}{x^2 + a^2}$ and illustrations

UNIT – V: Double Integrals

Double Integrals – Definition with Examples - Changing the order of Integration – Triple Integrals (Cartesian only) – Definition with Examples – Related Problems.

COURSE OUTCOME

The students will be able to

1. Understand the concept of successive Differentiation.
2. Calculate the notation of curvature and radius of curvature.
3. Solve the problems in integration using various methods.
4. Understand the concept of properties of definite integrals, integration by parts and reduction formulae.
5. Understand the concept of double and triple integrals.

TEXT BOOK(S)

1. Narayanan.S and Manichavasagam Pillai.T.K., 2003, Calculus, Volume I, S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.
2. Narayanan.S and Manichavasagam Pillai.T.K, 2011, Calculus, Volume II, S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.
UNIT - I Chapter 3 : Sec. 1.1 to 1.6, 2.1, 2.2 of [1]
UNIT - II Chapter 8 : Sec. 1.3 to 1.5 &
Chapter 10 : Sec. 2.1 to 2.4 of [1]
UNIT - III Chapter 1 : Sec. 7.3, 7.4, 8, 9 of [2]
UNIT - IV Chapter 1 : Sec. 11,12, 13.1 to 13.5 of [2]
UNIT - V Chapter 5 : Sec. 2.1, 2.2, 4 of [2]

REFERENCE BOOK(S)

1. Arumugam.S and Issac, 2013 , Calculus, Volume I , New Gamma Publishing House.
2. Khanna.M.L, 1994, Integral Calculus, 19th Edition, Published by Jai Prakash Nath & Co. Meerut City.
3. Hari Krishnan, 2013, Calculus, Atlantic publishers & distributions Pvt. Ltd.
4. Singh.U.P, Srivastava R.J, Siddiqui. N.H, 2003, Calculus, Dominant publishers and
5. Distributors, New Delhi.

E_RESOURCES:

1. file:///C:/Users/ELCOT/Downloads/AnElementaryTreatiseontheDifferentialandIntegralCalculus_10449393.pdf
2. http://djm.cc/library/Elements_Differential_Integral_Calculus_Granville_edited_2.pdf
3. <https://www.slideserve.com/jerod/hyperbolic-functions?fitview=true#ssShare>
4. <https://www.slideshare.net/informaticaacademy/successive-differentiation>
5. <http://www.math.odu.edu/~jhj/counter10.html>



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS
ALLIED COURSE – II
(For Physics & Chemistry)

Semester: I – AC – II: Algebra and Analytical Geometry (3D)

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:21AMM102

OBJECTIVES

- To inculcate the basic concepts of Algebra.
- To give depth knowledge of matrices and inculcate habit of problem solving.
- To enable the students to develop their skill in three dimensions.

UNIT I Binomial Theorem and Exponential

Binomial Theorem to the summation of series - Approximation of the series - Exponential Theorem (Proof not needed) – Summation of series - Related Problems.

UNIT II

Non-Singular, Symmetric, Skew symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary matrices – Characteristic equation, Eigen values, Eigenvectors – Cayley Hamilton's Theorem (proof not needed) related problems only.

UNIT –III: The Plane

Standard equation of a plane – Intercept form – Equation of the Plane Passing through the Points – Direction Cosines of the Line which is perpendicular to a plane - Angle between the planes – The ratio in which the plane divides the line joining the points – Equation of a Plane through the line of intersection of two given planes.

UNIT- IV: The Straight Line

Symmetrical form of straight line – Straight line passing through two points – The Condition for the line to be parallel to the plane - Angle between the plane – Conditions for the line Parallel to the plane - Coplanar lines – Shortest distance between two lines.

UNIT –V: The Sphere

Equation of a sphere – Centre and Radius – The Length of the tangent from the point to the Sphere – Equation of a circle on a Sphere - Equation of a sphere Passing through a circle – Intersection of two spheres is a circle – Equation of the Tangent plane to the Sphere.

COURSE OUTCOME

The students will be able to

1. Learn the binomial theorem and its summation and approximations.
2. Understand the types of matrices and its definitions and compute the Eigen value and Eigen vector.
3. Learn the angle between planes, bisector planes, perpendicular distance from a point to a plane and intersection of two lines.
4. Compute the angle between a line and a plane, length of perpendicular from a point to a line.
5. Understand the equation of a Sphere passing through the circle and tangent of the plane to the Sphere.

TEXT BOOK(S)

1. Manicavachagam Pillai.T.K, Natarajan.T, Ganapathy.K.S,2007, Algebra, Vol.I, S.Viswanathan Pvt Limited, Chennai.
2. Manicavachagam Pillai.T.K, Natarajan.T, Ganapathy.K.S, 2012, Algebra, Vol.II, S.Viswanathan Pvt Limited, Chennai.
3. Manicavachagam Pillai.T.K, Natarajan.T, 2008, Analytical Geometry(3D), S.Viswanathan Pvt Limited, Chennai.
UNIT- I Chapter 3 : Sec. 10 and 14 &
Chapter 4 : Sec. 2,3 of [1]
UNIT- II Chapter 2 : Sec. 1 to 14 and 16.2 to 16.3 of [2]
UNIT-III Chapter 2 : Sec. 1 to 9 of [3]
UNIT-IV Chapter 3 : Sec. 1 to 8 of [3]
UNIT-V Chapter 4 : Sec. 1 to 8 of [3]

REFERENCE BOOK(S)

1. Jain.P.K,1991 A Textbook of Analytical Geometry of Three Dimensions Second edition, New Age International Private Limited, New Delhi.
2. SannuRahi, 2009, Algebra, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Shanti Narayan, Dr. P.K.Mittal, 2016, Analytical Solid Geometry, S.Chand & company Private limited New Delhi.
4. Vaishtha.A.R, 1990, Analytical Solid Geometry, Krishna Prakashan Media Pvt Ltd, New Delhi.
5. William H. McCrea, 2012, Analytical Geometry of Three Dimensions, Dover Publications, New York.

E-RESOURCES

1. <https://www.google.com/amp/s/dokumen.tips/amp/documents/free-download-here-manickavasagam-pillai-volume-1pdf-free-download-here-algebra.html>
2. https://www.academia.edu/19646465/Analytical_solid_geometry_Shanti_Narayan
3. http://fhscastormath.weebly.com/uploads/1/2/4/7/12476962/chapter11_precal.pdf
4. <https://ncert.nic.in/textbook/pdf/lemh205.pdf>
5. <https://pdfbookslibs.com/a-textbook-of-analytical-geometry-of-three-dimensions-2nd.pdf>



BHARATHIDASAN UNIVERSITY,

TIRUCHIRAPPALLI- 620 024

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?! k Rsi U,I/
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialectics and Dynamics of Human Rights in India, Tagore Law 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, Sedappti, 1999.
7. Right to Information Act, 2005-
Website:www.tnpsc.gov.in/RTI%20ACT%202005.pdf
8. The Consumer Protection Act, 1986 – Website:
http://nedrc.nic.in/bare_acts/consumer%20Protection%20Act1986.html

SEMESTER II

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



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:21CH203

OBJECTIVES

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

UNIT I Chemical Bonding

(19 Hours)

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 H₂,O₂- Comparison of VB & MO Theories-Hybridisation – Formation of BeCl₂- VSEPR theory of simple inorganic molecules –PCl₅, SF₆, IF₇, XeF₆, 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, aluminothermic process-purification of metals – electrolysis ,zone refining, Van Arkel de-Boer process.

Zero group elements – position in the periodic table- occurrence- isolation, applications- compounds of Xe , XeF₆ & XeOF₄

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- Preparation of biphenyls- Physical and Chemical properties and uses.

UNIT IV Chemistry of Polymers

(17 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.

UNIT V Atomic Structure and Basic Quantum Mechanics

(16 Hours)

Rutherford's and Bohr's model an atom- Bohr's theory and origin of hydrogen spectrum. Sommerfield'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 Davisson and Germer experiment-Heisenberg's uncertainty principle- Schrodinger wave equation (Derivation not needed). Physical significance of Ψ and Ψ^2 .

COURSE OUTCOME

The students will be able to

1. Understand the common themes running through ionic ,covalent and metallic descriptions of chemical bonding
2. Appreciate how chemical substances can be described in terms of structure and bond type
3. The students must be able to recall general trends in the periodic table of elements and recall the structures, the properties applications and chemical reactivity of elements.
4. The students must be able to indicate how the properties of polymeric materials can be used by a product designer
5. Students should be able to state the location, relative charge atomic mass of the sub atomic particles.

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 BOOK(S)

1. Bahl BS, 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. Jerry March. 2013. Advanced Organic Chemistry, Reaction, Mechanism and Structure", 7th Edition, Wiley Inter Science.
4. Lee JD. 2000. Concise Inorganic Chemistry, 20th revised edition, Sultan Chand & Sons.
5. Morrison RT, Boyd RN, Bhattacharjee SK. 2011. Organic Chemistry, 7th edition, Pearson India

E- RESOURCES

1. www.ebooksdirectory.com
2. www.lamar.edu
3. www.neetprep.com
4. www.studyduniya.com
5. www.freebookcentre.net
6. www.kobo.com
7. www.pdfderive.com

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



SUNDARAKKOTTAI, MANNARGUDI - 614016
(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:21CH204P

OBJECTIVES

- To learn the methods of different inorganic and organic compounds preparation and analysis.

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. PotassiumTrioxalato aluminate(III)

COURSE OUTCOME

1. Key concepts of inorganic and organometallic chemistry including those related to synthesis, reaction chemistry, and structure and bonding
2. Basic and advanced laboratory procedures used in inorganic synthesis including spectroscopic and analytical techniques for identification and characterization of small molecules
3. Laboratory safety

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, NewDelhi.

E- RESOURCES

1. www.amazon.in
2. www.freebookscentre.net
3. www.pinterest.com
4. www.springer.com

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2024)

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:21ABO204

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

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

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- Areaceae and Poaceae.

UNIT III Plant Anatomy

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

UNIT IV Embryology

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

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

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* (4thEdition). 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. Esau K. 1980. *Plant Anatomy* (2ndEdition) Wiley Eastern Ltd., Madras.
3. Ganguly A.K. 1971. *General Botany*, Vol.I. The New Book Stall, Calcutta.
4. Jitendra Singh. 2014. *Basic Horticulture*. Kalyani Publishers, Chennai.
5. Lawrence, G.H.M. 1955. *An Introduction to Plant Taxonomy*. The Central Book Depot, Allahabad.
6. Naik, K.C. 1963. *South Indian Fruits and Their Culture*. Vardhachary & Co., Madras.
7. Naik, V.N. 1996. *Taxonomy of Angiosperms* (9thEd.). Tata McGraw-Hill Publishing Co., (P) Ltd., New Delhi.
8. Narayanaswamy, R.V. and Rao, K.N. 1976. *Outlines of Botany*. S. Viswanathan Printers & Publishers, Chennai.
9. Pandey, B.P. 1997. *Taxonomy of Angiosperms*. S. Chand & Company Pvt. Ltd., New Delhi.
10. Ramaswami, S.N., Lakshminarayana, S. and Venkateswaralu, V. 1976. *Taxonomy (Systematic Botany) for Degree Course*. Maruthi Book Depot, Guntur, Hyderabad.
11. Rao K.N. Krishnamurthy K.V. and Rao. G. 1979. *Ancillary Botany*. S. Viswanathan Printers & Publishers, Chennai.
12. Sundararajan, J.S., Muthuswamy, J., Shanmugavelu, K.G. and Balakrishnan, R. *A Guide to Horticulture*. Thiruvankadam Printers, Coimbatore.
13. Vashista, P.C. 1977. *A Text Book of Plant Anatomy*. S. Nagin and Co., New Delhi.
14. Vashista, P.C. 1997. *Taxonomy of Angiosperms*. S. Chand & Company Pvt. Ltd., 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. <http://ppup.ac.in/download/econtent/pdf/Prof%20%20ovule%20structure.pdf>
2. <https://drive.google.com/file/d/1GBdHkCd4tbTHX6nUawGWss3BcBYGoMId/view>

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



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2024)

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:21ABO203P

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. Subramaniyan, N.S. 1999. *Laboratory Manual of Plant Taxonomy (2ndEd.)*. Tata McGraw-Hill Publishing Co., NewDelhi.

E- RESOURCES

1. <https://drive.google.com/file/d/1GBdHkCd4tbTHX6nUawGWss3BcBYGoMId/view>
2. https://www.magadhuniversity.ac.in/download/econtent/pdf/E-content_11.07.2020.pdf



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

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(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS
ALLIED COURSE – II
(For Physics & Chemistry)

Semester: II – AC – III: Trigonometry and Fourier Series

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:21AMM203

OBJECTIVES

- To inculcate the basic concept of Trigonometry.
- To acquaint problem solving skills to the students in Fourier series.
- To learn the Fourier series expansion of periodic function with the period of 2π .

UNIT I Demovier's Theorem for Rational Number

Introduction -Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer) – Related Problems – Expansion of $\sin^n\theta$, $\cos^n\theta$ – Related Problems – Expansion of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in terms of powers of θ – Related Problems.

UNIT –II: Hyperbolic Functions

Introduction - Hyperbolic functions – Results – Related Problems – Relation between Hyperbolic and Circular functions – Related Problems –Expansion of Inverse Hyperbolic functions – Related Problems –Separation of real and imaginary parts – Related Problems.

UNIT –III: Logarithm of a Complex Number

Introduction - Logarithm of a complex number – Related Problems – Summation of a series – Related Problems – Difference Method – Related Problems – Angles in Arithmetic Progression method – Related Problems.

UNIT- IV: Fourier Series

Fourier Series – Definition – Related Problems – Fourier Series Expansion of Periodic Functions with period 2π – Definition – Related Problems – Odd and Even Functions – Definition– Properties of Odd and Even Functions – Related Problems.

UNIT –V: Half Range Fourier Series

Half range sine series – Definition – Related Problems - Half range cosine series – Definition – Related Problems – Change of Interval – Definition – Related Problems.

COURSE OUTCOME

The students will be able to

1. Describe the expansion of $\sin n\theta$ and $\cos n\theta$ and its related problems.
2. Understand the hyperbolic functions and its relation between hyperbolic and circular functions.
3. Understand the summation of series and its methods.
4. Understand the concept of fourier series and familiarizes with odd, even fourier series with their periodic functions.
5. Analyse the half range sine and cosine functions and its change of interval.

TEXT BOOK(S)

1. Arumugam.S, Thangapandi Issac.A and Somasundaram. A, 1999, Trigonometry and Fourier series, New Gamma Publications, Palayamkkottai.
2. Narayanan. S and Manicavachagam Pillay. T. K, Viswanathan.S, 2014, Calculus Volume III- Private limited, Chennai.
UNIT- I Chapter 1 : Sec. 1.2 to 1.4 of [1]
UNIT- II Chapter 2 : Sec. 2.1 and 2.2 of [1]
UNIT- III Chapter 3 & Chapter 4 : Sec. 4.1 to 4.3 of [1]
UNIT- IV Chapter 6 : Sec. 1 to 3 of [2]
UNIT- V Chapter 6 : Sec. 4 to 6 of [2]

REFERENCE BOOK(S)

1. Dyke.P.P.G, 2001, An Introduction to Laplace Transforms and Fourier Series, Spinger – Verlag, London.
2. Gelfand.I.F, Saul.M, 2012 Trigonometry, Spinger – Verlag, London.
3. Jain.S.K, 2001, Fourier Series and Fourier Transforms, Sarup and Sons, New Delhi.
4. Rawat.K.S, 2005, Trigonometry, Sarup and Sons, New Delhi.
5. Robert.T Seeley, 2006 An Introduction to Fourier Series and Integrals, Dover Publications, New York.

E-RESOURCES

1. https://orion.math.iastate.edu/butler/PDF/trig_notes.pdf
2. <http://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf>
3. <https://lib.alfaisal.edu/pdf/AlgebraAndTrigonometry-LR.pdf>
4. <https://math.mit.edu/~gs/cse/websections/cse41.pdf>
5. <https://fenedebiyat.siirt.edu.tr/dosya/personel/uygulamali-matematik-siirt-201935221347541.pdf>

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – IV

(For Physics & Chemistry)



Semester: II – AC – IV: ODE, PDE and Laplace Transforms
Ins. Hrs./Week: 4 Course Credit: 3 Course Code:21AMM204

OBJECTIVES

- To learn the basic concepts of Ordinary Differential Equations and Partial Differential Equations.
- To learn the concept of linear equation with constant coefficient.
- To train the students in problem solving skills of Partial Differential Equations and Laplace Transforms.

UNIT I Differential Equations of the First Order

Equations of the first order, higher degree differential equations solvable for x - Equations solvable for y - Equations solvable for dy/dx – Clairaut's Form – Related problems.

UNIT II Linear Differential Equations with Constant coefficients

Linear differential equations with constant coefficients – Particular Integral – Finding Particular integrals in the cases of e^{kx} , $\sin(kx)$, $\cos(kx)$ (where k is a constant), x^k (where k is a positive integer), and $e^{kx}f(x)$ (where $f(x)$ is any function of x) – Related problems.

UNIT III First Order Partial Differential Equations

Formation of Partial differential equations by eliminating constants and by elimination of arbitrary functions – Definition of general, particular & complete solutions – Singular integral (geometrical meaning not required) – Solutions of first order equations in the standard forms - $f(p, q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f_1(x, p) = f_2(y, q)$, $z = xp + yq$ + $f(p, q)$ - Lagrange's Equations - Related problems.

UNIT IV Laplace Transform

Laplace Transform – Definition – basic theorems and formulas – Related Problems – First Shifting Theorem – Laplace transform of first and second derivatives – Related Problems – Laplace Transforms of Periodic functions – Related Problems.

UNIT V Inverse Laplace Transform

Inverse Laplace Transforms related to the above standard forms – Definition – basic Theorems and formulas – Related Problems – Solving Second Order ODE with constant Co-efficient using Laplace Transforms – Related Problems.

COURSE OUTCOME

The students will be able to

1. Differentiate the order and degree of the Ordinary Differential Equations.
2. Identify some specific methods and solve them.
3. Understand the formation of Partial Differential Equations by eliminating constants and arbitrary functions.
4. Calculate the Laplace Transforms and its related problems.
5. Understand the Inverse Laplace Transforms and solving second order Ordinary Differential Equations with constant co-efficient.

TEXT BOOK(S)

1. Narayanan.S and Manicavachagam Pillay.T.K, Viswanathan.S, 2014, Calculus Volume III- Private limited, Chennai.
UNIT – I Chapter 1 : Sec. : 5,6
UNIT – II Chapter 2 : Sec. : 1 to 4
UNIT – III Chapter 4 : Sec. : 1, 2, 3, 5[5.1 to 5.4], 6
UNIT – IV Chapter 5 : Sec. : 1, 2, 4, 5
UNIT – V Chapter 5 : Sec. : 6 to 11

REFERENCE BOOK(S)

1. Dyke.P.P.G, 2001, An Introduction to Laplace Transforms and Fourier Series, Springer – Verlag, London.
2. Joel Schiff.J, 1999, The Laplace Transform Theory and Applications, Springer – Verlag, New York.
3. Khanna.M.L, 1994, Differential Equation, Jaiprakashnath& Meerut.
4. Raut.K.S, 2003, Differential Equation, Swarup and Sons, New Delhi.
5. Raisinghania.M.D, 2013, Ordinary and Partial Differential Equations S.Chand and Co. Ltd, New Delhi.

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1. <https://www.math.ust.hk/~machas/differential-equations.pdf>
2. https://www.researchgate.net/publication/267487772_Differential_Equations_and_Their_Applications
3. https://www.researchgate.net/publication/332863667_PROBLEMS_SET_SOLUTIONS_DIFFERENTIAL_EQUATION
4. https://www.researchgate.net/publication/333894393_Notes_on_the_Laplace_Transforms
5. <http://www.personal.psu.edu/wxs27/250/NotesLaplace.pdf>

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620 024
ENVIRONMENTAL STUDIES

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, water logging, 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 resources, 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
Biogeographical 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.

III-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 health
Case 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>.

SEMESTER III

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



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:

UNIT I Chemistry of P-Block Elements – B, C and N Families (19 Hours)

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.

General characteristics of elements of V A Group – preparation of nitrogen physical and chemical properties of N₂ – uses.

UNIT II Chemistry of P- Block Elements - O, X Families (19 Hours)

Anomalous behavior of oxygen – paramagnetic nature of oxygen, Preparation, properties, structure and uses of oxygen, classification of oxides based on their chemical behavior – acidic oxide, amphoteric oxide and neutral oxides. Classification of oxides based on oxygen content – normal oxides, peroxides, super oxides, dioxides, sub oxides and mixed oxides. General characteristics of halogen with reference of electro negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine- – basic nature of iodine - Inter halogen compounds and pseudo halogens.

UNIT III Organo Halogen Compounds (16 Hours)

Nomenclature – (Aliphatic and Aromatic -mono, di, tri functional group) - general methods of preparation of haloalkanes – physical and chemical properties – uses – nucleophilic substitution mechanisms (SN¹, SN² and SN³) - Chlorobenzene preparation-physical properties – chemical properties - uses - electrophilic substitution mechanisms – theory of orientation and reactivity.

UNIT IV Stereochemistry (19 Hours)

Principles of symmetry – symmetry elements (C_n, C_i and S_n) - asymmetry and dissymmetry – isomerism – constitutional isomers - stereoisomers – enantiomers – diastereomers - geometrical isomerism – meso and dl compounds - conventions used in stereochemistry: Newman, Sawhorse and Fischer notations and their interconversions. Nomenclature, correlation of configuration – Cahn-Ingold-Prelog rules for simple molecules - R,S and D,L notations to express configurations - chirality - optical isomerism - optical activity – polarimeter – specific rotation - stereochemistry of allenes and spiranes

Atropisomerism - erythro and threo conventions – stereoselectivity, stereospecificity in organic reactions with examples. Resolution of racemic mixture

– Walden Inversion – conformational analysis of cyclohexane - asymmetric induction.

UNIT V Gaseous State

(17 Hours)

Gases - Boyle's law, Charles law, and Avogadro's law- Ideal gas equation - Real gases-deviation from ideal behavior- Vander Walls equation of states derivation-significance of critical constants-Law of corresponding states-Inversion temperature – Liquefaction of gases-linde and Claude demagnetization methods- Maxwells distribution of molecular velocities (Derivation not needed)-Types of molecular velocities- mean ,most probable and root mean square velocities – Definition of collision diameter, mean free path and collision number.

Total Lecture Hours- 90

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 P Block element
3. Understand the preparation, mechanism of Organo halogen compounds.
4. Recognize and draw constitutional isomers, stereo isomers, including enantiomer, diastereomers, racemic mixture and meso compounds.
5. Understand the characteristics of gas,
6. Discuss the types ,structure and properties of solids and liquid crystals.

TEXT BOOK(S)

1. Anil J Elias. 2019. The Chemistry of p block elements, Synthesis, Reactions and Applications, First Edition, The orient Black swan.
2. Arun Bahl and BS Bahl. 2018. A Text book of Organic Chemistry, 5th edition, New Delhi,Sultan Chand & Co.
3. Buri BR, Sharma LR and Pathania MS, 2020. Principles of Physical Chemistry, 47th 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. Glass tone S, Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd
2. Lee JD. 2006. Concise Inorganic Chemistry, UK, Black well 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, 33rd edition,Vishal Publishing & Co.

E-RESOURCES

1. <http://jpsw.shikshamandal.org> chemistry of p block elements
2. <https://www.britannica.com>. Organohalogen compounds
3. <https://wiki.ubc.ca>. chemistry of p block elements
4. <https://www.khanacademy.org>.stereochemistry
5. <https://www.topper.com>chemistry The gaseous state
6. <searchworks.stanford.edu/view/4002582>
7. <pubs.acs.org/doi/10.1021/ed073pA174>

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



SUNDARAKKOTTAI, MANNARGUDI - 614016
(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

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 semi micro method.

Scheme of Evaluation

External: 60

Internal: 40

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

COURSE OUTCOME

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 the reactions of various functional groups
5. Determine physical constants

TEXT BOOK(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.

REFERENCE BOOK(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, Aran Kumar 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)

SUNDARAKKOTTAL, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Ins. Hrs./Week: 4

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

Course Credit: 4

Course Code:

UNIT I Chemistry of d & f- -block elements (13hours)

Chemistry of transition elements – electronic configuration – general periodic trend – group study of titanium, vanadium, chromium, manganese, and iron.

General characteristics of f-block elements – comparative account of lanthanides and actinides – occurrence, oxidation states, magnetic properties, color, and spectra – lanthanides and actinides- separation by ion exchange and solvent extraction methods – lanthanide contraction – chemistry of thorium and Uranium.

UNIT II Chemistry of Organometallic Compounds (10hours)

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

UNIT III Chemistry of Alcohol, Phenol and Ethers (12hours)

Nomenclature – laboratory preparation of alcohols - Cumene process– industrial source of alcohols – physical properties – chemical properties – uses – chemistry of glycols and glycerol's – uses – preparation of phenols including di and tri hydric phenols – physical and chemical properties – uses - laboratory preparation of ethers.

UNIT IV Thermodynamics - I (13hours)

Definitions- system and surrounding- isolated, closed and open system- state of the system- Intensive and extensive variables. Thermodynamic processes-

reversible and irreversible, isothermal and adiabatic processes- state and path functions. 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 of ideal 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 of reaction- Kirchoff's equation- bond energy and its calculation from thermochemical data- integral and differential heats of solution and dilution.

UNIT V Chemical Kinetics

(12 hours)

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- 60

COURSE OUTCOME

The student will be able to,

1. Describe general trends in d block elements and the preparation, properties of Lanthanides and Actinides.
2. Understand Organometallic compounds preparation & Properties
3. the stability and reactivity of simple organometallic compounds.
4. Understand the preparation and properties of the alcohol and phenols
5. Discuss the characteristics of solid and liquid crystals.
6. Understand the basic concepts and temperature dependence of rate constant in terms of Arrhenius equation.

TEXT BOOK(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. Glasstone S, Lewis D. Elements of Physical Chemistry, London, Mac Milan & Co.
3. Lee JD. 2006. Concise Inorganic Chemistry, UK, Black well Science
4. Morrison RT, Boyd RN. 2018. Organic Chemistry. 6th edition, New York, Alyn & Bacon Ltd.,
5. Puri BR, Sharma LR, Kalia KK. 2020. Principles of Inorganic Chemistry, 33rd edition, Vishal Publishing & Co.,

E-RESOURCES

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2. https://pubs.acs.org/doi/10.1021/jo00392a011organometallic_compounds
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
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DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY



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

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

Semimicro Inorganic Qualitative Analysis

Analysis of a mixture containing two cations and two anions of which one will be an interfering acid radical. Semimicro 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	-	50 marks
	: Record	-	10 marks
	: Total	-	60 marks
4 radicals correct with suitable tests:		-	50 marks
3 radicals correct with suitable tests:		-	40 marks
2 radicals correct with suitable tests:		-	30 marks
1 radicals correct with suitable tests:		-	15 marks
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. Amarnath Mishra. 2018. Qualitative Inorganic Analysis, Bharati Bhawan (P& D).
2. Rakesh Sharma L, Dr. 2021. Practical Inorganic Chemistry. Evince Publishing.
3. Shikha Gulati JL, Sharma, Shagun Manocha. 2017. Practical Inorganic Chemistry. CBS Publisher Pvt Ltd.
4. Svehla G, Sivasankar B. 2012. Qualitative Inorganic Analysis. 7th Ed, Pearson Education, India.
5. Vogel, 2000. Text Book of Quantitative Inorganic Analysis. 6th Ed, Longman, New Delhi.

REFERENCE BOOK(S)

1. George Marr BW, Rachel. 1972. Practical Inorganic Chemistry. Van Nostrand Reinhold Company.
2. Gurdeep Raj. 2013. Advanced Practical Inorganic Chemistry. Krishna Prakashan Media (P) Ltd.
3. Ramanujam VV. 1988. Inorganic Semimicro Qualitative Analysis. 3rd Ed, National Pubs, London.
4. Sonia Ratnani, Swati Agarwal, Sujeet Mishra, 2020. Practical Chemistry, Ist Ed, McGraw Hill Education Private Ltd.
5. Svehla G. 1987. Text Book of Macro and Semimicro Qualitative Inorganic Analysis. 5th Ed, 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/>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAL, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



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

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:

UNIT I Milk

(7 hours)

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, Physico – chemical change taking place in milk due to processing parameters – boiling pasteurization, sterilization and homogenization.

UNIT II Carbohydrates & Vitamins

(7 hours)

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. A shank mineral matters in milk.

UNIT III Lipids

(6 hours)

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

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

UNIT IV Fermentation

(5 hours)

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

UNIT V Milk Powder

(5 hours)

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

COURSE OUTCOME

The student will 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

TEXT BOOK(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.

REFERENCE BOOK(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, Blackieb 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>

SEMESTER V

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY



Ins. Hrs./Week: 5 **Semester: V-CC-V: Inorganic Chemistry** **Course Code:**
Course Credit: 5

OBJECTIVES

- To understand the basics and theories of coordination compounds.
- To study a few biologically important coordination compounds.
- To know the preparation and properties of nitrosyl compounds.

UNIT I Coordination Compounds – I (16 Hours)

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. Stereoisomerism: 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 (16 Hours)

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 – III (15 Hours)

Labile and inert complexes, stability of coordination compounds – thermodynamic and kinetic stability, relationship between stepwise formation constant and overall formation constant, factors 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 (14 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 (14 Hours)

Nitrosyl compounds: Classification – nitrosyl chloride and sodium nitroprusside – 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 student will be 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.
6. Gain knowledge a few biologically important coordination compounds.

TEXT BOOK(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, McGraw 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 EAV. 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,.
8. Parish RV. 1990. NMR, NQR, EPR, and Mossbauer Spectroscopy in Inorganic Chemistry, Ellis Harwood Limited, London,

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>

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Ins. Hrs./Week: 5

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

Course Credit: 5

Course Code:

OBJECTIVES

- To recognize and predict the products of the reactions of carbonyl compounds.
- To understand the chemistry of Nitrogen compounds.
- To study the synthesis of Heterocyclic compounds and dyes.

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 – paraformaldehyde, meta formaldehyde - uses of aliphatic carbonyl compound - Claisen condensation – Aldol condensation – Robinson annulation.

UNIT II Chemistry of Carboxylic Acids (16 Hours)

Nomenclature - Acidity of carboxylic acids based on substituent effect - comparison of acid strengths of halogen substituted acetic acids - acid strengths of substituted benzoic acids - Acid derivatives - Nucleophilic substitution mechanism at acyl carbon. 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. Preparation of dicarboxylic acid - physical and chemical properties - uses. Introduction to oils and fats - fatty acids - manufacture of soap - mechanism of cleaning action of soap.

UNIT III Chemistry of Nitrogen Compounds (14Hours)

Nomenclature - nitro alkanes - alkyl nitrites - differences - aromatic nitro compounds - preparation and reduction of nitro benzene under different conditions, TNT. Amines – effect of substituents on basicity of aliphatic and aromatic amines - Reactions of amino compounds (primary, secondary, tertiary and

quaternary amine compounds) - Mechanism of carbylamine reaction, diazotization and comparison of aliphatic and aromatic amines. Diazonium compounds - preparation and synthetic applications of diazomethane, benzene diazonium chloride and diazo acetic ester.

UNIT IV Chemistry of Heterocyclic Compounds and Dyes (15 Hours)

Introduction – nomenclature of heterocyclic compounds having not more than two heteroatoms such as oxygen, nitrogen and sulphur - structure, synthesis and properties of furan, pyrrole, thiophene. Pyridine – structure, preparation - compare the basicity of pyridine with pyrrole and amines.

Quinoline - structure and Skraup synthesis. Isoquinoline – structure and Napieralski synthesis and Indole – structure and Fischer-indole syntheses. 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.

UNIT V Oxidation and Reduction (14 Hours)

Oxidation: Osmium tetroxide – Chromyl chloride – Ozone – DDQ – Dioxiranes. Lead tetraacetate - selenium dioxide – DMSO either with Ac₂O or oxalyl chloride – Dess-Martin reagent.

Reduction: Catalytic hydrogenation using Wilkinson Catalyst – Reduction with LAH, NaBH₄, tritertiarybutoxy aluminum hydride, NaCNBH₃, hydrazines.

Total Lecture Hours- 75

COURSE OUTCOME

The student will be able to,

1. Recognise how different compounds are prepared by the reactions 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 in 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-lnt008jan10>
2. https://www.ch.ic.ac.uk/widdowson/teach_files/nitrogen/dw1.html.
3. <https://en.unipr.it/ugov/degreecourse/171553>
4. <https://catalogue.nla.gov.au/record/393582>
5. <http://sustainabilityforschools.org/assets/chemistry-guide-for-teachers.pdf>

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 6

Course Credit: 5

Course Code:

OBJECTIVES

- To know the various concepts of photochemistry.
- To learn the second law, third law of thermodynamics
- To understand the fundamental concepts of phase rule and its applications to one, two component system.

UNIT- I: Photochemistry and its Applications (17 Hours)

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 (20 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 - Kirchoff's reaction- bond energy and its calculation from thermochemical data- integral and differential heats of solution and dilution.

UNIT –III: Thermodynamics-II (19 Hours)

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's free energy(G) and Helmholtz free energy (A) – variation of A and G with P, V and T - Gibbs's - Helmholtz equation and its applications. Thermodynamic equation of state, Maxwell's relations - ΔA and ΔG as criteria for spontaneity and equilibrium.

UNIT- IV: Thermodynamics-III (17 Hours)

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

CaCO₃. 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) - Gibb's Duhem equation .Van't Hoff's isochore. Clapeyron equation and Clausius – Clapryron 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 (17 Hours)

Raoult's law, Henry's law, Ideal and non Ideal solutions, Completely miscible liquid systems – benzene and toluene. Partially miscible liquids – Phenol - Water, Triethylamine - 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 – super cooling, 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- 90

COURSE OUTCOME

The student will be 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.
6. Students can acquire knowledge about second and third law of thermodynamics

TEXT BOOK(S)

1. Arun Bahl BS Bahl and GD, Tuli, 2014. Essentials of Physical Chemistry, New Delhi. S.Chand & Company Pvt.Ltd,
2. Grudeep raj. 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 RK. 2017. A Text book of Engineering thermodynamics (5th edition), Laxmi publications, New Delhi.
5. Rastogi RP, Misra RR. 2018. An Introduction to Chemical Thermodynamics. 6th revised Ed, Vikas Publishing House Private Ltd, Noida, UP.

REFERENCE BOOK(S)

1. Atkins PW 1994. Physical Chemistry, 5th edition, Oxford University Press, India
2. Glass stone S, Lewis D. Elements of Physical Chemistry, Mac Millan & Co Ltd London.
3. Puri BR, Sharma LR Pathania MS. 2013, Principles of Physical Chemistry, 35th edition, Shoban Lal Nagin Chand and Co, New Delhi.
4. Rajaram J, Kuriacose JC. 1986. Thermodynamics for students of chemistry, Lal Nagin Chand, New Delhi.
5. Samuel Glass stone, 1974. Thermodynamics for Chemists, 3rd edition, East- West Publishers, America.
6. Sangaranarayanan MV, 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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DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY

Semester: V-CP-V: Physical Chemistry Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code:

OBJECTIVES

- To learn the fundamentals of conductometric and potentiometric titrations.
- To understand the method of determination of molecular weight, CST, TT and rate constant.
- To derive essential mathematical relationships

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 tetrachloride.
8. Conductometric Acid-Base Titration
9. Potentiometric Redox Titration
10. Determination of cell constant

Scheme of evaluation:

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

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 Co efficient of iodine between water and carbon tetrachloride.
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 the results of such experiments.
5. Solving problems, critical thinking and analytical reasoning.

TEXT BOOK(S)

1. Abbot D. 1965. Practical Physical Chemistry Little hampton Book service Pvt Ltd.
2. Gupta, Renu. 2017. Practical Physical Chemistry New age 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, Went worth 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>

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Semester: V-MBE-IA: Material and Nanochemistry

Ins. Hrs./Week: 5

Course Credit: 4

Course Code:

OBJECTIVES

- To study the types of ionic crystals and defects in solids.
- To learn the different kinds of magnetic properties.
- To understand the basic concepts of nanomaterial's and their applications.

UNIT- I: Ionic Conductivity and Solid Electrolytes (13 Hours)

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 (14 Hours)

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. Ferro electric materials: examples – application of ferroelectrics.

UNIT –III: Modern Engineering Materials (16 Hours)

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: Nanophase Materials (17 Hours)

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

UNIT –V: Nano Technology (15 Hours)

Introduction – importance – various stages of nanotechnology – nanotube technology - nanoparticles- fullerenes- nanodendrimers - nano pore channels, fibers and scaffolds - CVD diamond technology - FCVA technology and it's applications – nano imaging techniques.

Total Lecture Hours- 75

COURSE OUTCOME

The student will be 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 Bio materials.
4. Analysis the techniques of Nanophase materials.
5. Discuss about the uses of nanotechnology.

TEXT BOOK(S)

1. Geoffrey A, Ozin Andre C, Arsenault. 2006. A Chemical Approach to Nano materials, 1st edition, RSC publications.
2. Kenneth klabunde, Gleb Sergeev. 2013. Text Book of Nanochemistry, 2nd Edition, Elseiver.
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, 1stedition, Springer - Verlag, New York.

REFERENCE BOOK(S)

1. Aathony 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. PradeepT. 2007. Nano The Essentials in Understanding Nanoscience and Nanotechnology; 1st Ed., Tata McGraw Hill, New York.
5. Ragavan VR. 2001. Materials Science and Engineering, Printice 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>

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Semester: V-MBE-IB: Analytical Chemistry

Ins. Hrs./Week: 5

Course Credit: 4

Course Code:

OBJECTIVES

- To understand the storage and handling of various chemicals and first aid procedure.
- To learn data analysis, various separation techniques.
- To study the gravimetric analysis and various thermo and electro analytical methods.

UNIT - I: Laboratory Hygiene and Safety (13 Hours)

Storage and handling of chemicals - corrosion, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple first aid procedures for accidents involving acids, alkalines, bromine burns 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 (17 Hours)

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 (17 Hours)

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 (14 Hours)

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**(14 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- 75**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 thermo analytical techniques.
4. Expose the knowledge on spectrophotometric and colorimetric techniques.
5. Gain knowledge the various electro analytical 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, Sultan chand.
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, Barners 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/bnZnR2hPaUVqRU9TbFc2Rmp1MVJz MDFQWHVwTENHaVhxb2h6bnpCWHMzYz0>
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>

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DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY



Ins. Hrs./Week: 2

Semester: V-SBE-II: Textile Chemistry

Course Credit: 2

Course Code:

OBJECTIVES

- To understand the different types of fibres
- To learn the concept of bleaching and chemicking
- To learn the Dyeing, finishing and water proofing Process

UNIT I Classification of Fibres (5 Hours)

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 (wool and silk)

UNIT II Structure and Properties of Fibres (7 Hours)

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

UNIT III Impurities of Fibres (5 Hours)

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 (7 Hours)

Finishing- finishes given to fabrics – mechanical finishes on cotton, wool and silk, method used in process of mercerizing-anti-crease and anti-shrink finishes-water proofing.

Total Lectures Hours- 30

COURSE OUTCOME

The student will be 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. Acquire knowledge about actions the finishing and water proofing methodology.

TEXT BOOK(S)

1. Hall.A.J, 2009. Text book of Textile Science 1st edition, Dorling Kindersley (India) Pvt. Ltd., New Delhi.
2. Kapur K. 2010. Text Book of Applied Chemistry, 3rd edn, wiley publications.
3. Thomas Bechtold and Tung Pham, 2019. Textile Chemistry, 1st edn, Springer-Verlag, New York
4. Vishu Arora. 2011. Textile Chemistry, 1st edition, Artech House, Boston.
5. Vatsala R. 2009. Textbook of Textiles and Clothing, 1st edn, Atlantic Publishers and Distributors.

REFERENCE BOOK(S)

1. Bruno Nuntak. 2007. The Identification of Textile Fibres, 1st edition, RSC publications.
2. De Gruyter. 2009. Textile Chemistry, 1st edn, Tung Pham.
3. Maryory L Joseph. 2012. Introduction to Textile Science, 3rd edition, John Wiley and Sons, Chichester.
4. Sadov F, Horchagin M, Matetshy A. 2007. Chemical Technology of fibrous Materials 1st edition, Mir publishers
5. Sheraz Ahmad, Ali Afzal. 2004. Advanced Textile Testing Techniques, 1st edition, Dorling Kindersley (India) Pvt. Ltd., New Delhi.

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 THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021 – 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



Semester: V-SBE-III: Polymer Chemistry

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:

OBJECTIVES

- To understand the different mechanism of polymerisation
- To explain the polymerization techniques and commercial applications of different Polymers
- To determine the molecular weight of polymers by various methods

UNIT I Basic Concepts in Polymers

(6 Hours)

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

UNIT II Polymerization Techniques

(5 Hours)

General methods of polymerization bulk, solution, suspension and emulsion polymerization. Study of commercial polymers– poly acrylonitrile, poly methylmethacrylate, poly urethanes, poly vinylchloride, poly tetrafluoroethylene, polyamides.

UNIT III Characterisation of Polymers

(7 Hours)

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

(7 Hours)

Polymer degradation – definition, types. Thermal degradation, mechanical degradation. Photo degradation, 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 student 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. Discuss the fabrication techniques and applications of polymers

TEXT BOOK(S)

1. Billmeyer FW. 1984. Text book of polymer science, 1st edition Jr. John Wiley and Sons Publication.
2. Chand S. 2004. A Text Book of Polymer Chemistry, 1st edn, RSC publications.
3. Fred W Billmeyer. 2004. Text book of Polymer Science, 1st edition, Dorling Kindersley, India, Pvt. Ltd., New Delhi.
4. Gowarikor VR. Viswanathan NV. Jayadev Sreedhar. 2005. Polymer Science, Revised edition, New Age International Pvt. Ltd.,
5. Robert J Young, Peter A Lovell. 2011. Introduction to Polymers, 1st edition, RSC publications.

REFERENCE BOOK(S)

1. Arora M.G., Singh M. and Yadav M.S.,1989. Polymer Chemistry, 2nd Revised edition, anmol Publications Private Ltd., New Delhi.
2. Fred.W.Billmeyer JR,2007. Polymer Chemistry, 3rdedition John Wiley & Sons (P) Ltd.
3. Odian.G,2012. Principles of polymerization, 2nd edn., John Wiley & Sons, New York
4. Paula Hammond, 2006. Synthetic of Polymers, 1st edition, John Wiley & Sons (P) Ltd.
5. Sharma, B.K. 1989. Polymer Chemistry, Goel Publishing House, Meerut.

E-RESOURCES

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



**Bharathidasan University
Tiruchirappalli – 620 024.
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. Alex S. Chand & Company Ltd. Ram Nagar, New Delhi-110 055

Reference Books

- (i) Developing the leader within you John C Maxwell
- (ii) Good to Great by Jim Collins
- (iii) The Seven habits of highly effective people Stephen Covey
- (iv) Emotional Intelligence Daniel Goleman
- (v) You can win Shive Khera
- (vi) Principle centered leadership Stephen Covey

SEMESTER VI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



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

Ins. Hrs./Week: 6

Course Credit: 6

Course Code:

OBJECTIVES

- To learn the chemistry of carbohydrates, Proteins and Vitamins and alkaloids and terpenoids.
- To understand the reaction mechanisms through molecular rearrangement,
- To learn the spectroscopy techniques for the elucidation of structures.

UNIT I Chemistry of Carbohydrates

(16 Hours)

Carbohydrate - classification, properties of mono saccharides (glucose and fructose), structure and configuration of mono saccharides, interconversion.

Ascending and descending series, mutarotation, epimerization- cyclic structure - determination of size of sugar rings.

Disaccharides - sucrose, maltose - structure elucidation - polysaccharide - starch and cellulose (elementary treatment).

UNIT II Chemistry of Proteins and Vitamins

(19 Hours)

Amino acids – Zwitter ion – isoelectric point - general methods of preparation and reactions of amino acids. Peptides - Peptide linkages – proteins - classification of proteins. Structure of proteins - primary structure - end group analysis - Edman method - secondary structure - tertiary structure - denaturation - colour reactions of proteins.

Nucleic acids - elementary treatment of DNA and RNA - Vitamins - classification, structure and biological importance of vitamins A, B₁, B₂, B₆, B₁₂ and C.

UNIT III Chemistry of Alkaloids and Terpenoids

(19 Hours)

Chemistry of natural products - alkaloids – classification, isolation - methods for synthesis of coniine, piperine, nicotine and quinine.

Terpenoids - classification - isoprene, special isoprene rule, methods for synthesis of citral, limonene, menthol, camphor.

UNIT IV Molecular Rearrangements

(17 Hours)

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

(19 Hours)

UV - VIS spectroscopy - types of electronic transitions – Instrumentation- solvent effects on λ_{max} - Woodward - Fieser rules for calculation of λ_{max} : dienes only – bathochromic shift and Hypsochromic 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, Mc Lafferty rearrangement, Importance of metastable peaks.

Total Lectures Hours- 90

COURSE OUTCOME

The students will be 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
6. Can able to know all the spectroscopic techniques in the electromagnetic spectrum
7. Study of instrumentation techniques very much useful to identify the simple as well as complex organic molecules.

TEXT BOOK(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. Bahl BS, Bahl A. 2010. Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.,
2. Finar IL. 1996. Organic Chemistry, Vol 1 & 2, 6th edition, addison WesleyLongman Ltd., England,
3. Morrison RT, Boyd RN, Bhattacharjee SK. 2 0 1 1. 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. 2 0 0 5 . 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 THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs./Week: 6

Course Credit: 6

Course Code:

OBJECTIVES

- To learn the various concepts of electrochemistry
- To know the types and theories of catalysis
- To know the spectroscopic techniques such as IR, UV- Visible, Raman and NMR .

UNIT- I: Electrical Conductance (21 Hours)

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 (18 Hours)

Definition, classification, structure, properties and functions of amino acids; Peptides and peptide bond. Proteins- Definition, classification, properties, Biological importance. Structure of proteins- primary structure, secondary, tertiary and quaternary structure; forces stabilizing the structure of proteins. Super secondary structure of proteins.

UNIT –III: Catalysis and Surface Phenomena (18 Hours)

Catalyst - Definition and characteristics- Types of catalysis - Homogenous and heterogeneous induced, auto, positive and negative catalysis, catalytic Poisons and Catalytic promoters. 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 (17 Hours)

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 hotbands.

UNIT –V: Spectroscopy – II

(16 Hours)

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 student will be able to,

1. Understand the various law and its applications.
2. Understand the mode of action of catalysis, classification of catalyst and comparison of homogeneous and heterogeneous catalysis
3. Reconizetheory of catalysis and different Adsorption.
4. Discuss theory and Principles of IR and Electromagnetic Spectrum.
5. Understand the basic concepts of Raman and NMR Spectroscopy.
6. Students can gain knowledge on general basic principles of spectroscopy.
7. Students can acquire knowledge on rotational spectroscopy and its applications.

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
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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY



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

Ins. Hrs./Week: 5

Course Credit: 3

Course Code:

OBJECTIVES

- To learn the techniques of Gravimetric analysis
- To describe the concentration of several cations
- Students will learn and apply the basic techniques used in Gravimetric analysis

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

Results

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

COURSE OUTCOME

The student will be 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 . JL. 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. Gravimetric Analysis Part 2. Vol 7. 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
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DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY

Semester: VI-MBE-IIA: Nuclear, Industrial Chemistry & Metallic State
Ins. Hrs./Week: 6 Course Credit: 5 Course Code:

OBJECTIVES

- To know the fundamentals of nuclear chemistry.
- To understand the applications of nuclear chemistry.
- To understand the theory and applications of metallic bond

UNIT- I: Nuclear Chemistry I

(19 Hours)

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

(19 Hours)

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

(19 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 – Rutherby 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

(17 Hours)

Inorganic polymers – coordination polymers , metal alkalis, phosphonitrilic 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

(16 Hours)

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- 90

COURSE OUTCOME

The student will be able to,

1. Analysis the fundamentals of nuclear chemistry.
2. Understand the nuclear reactions 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.
6. The students become familiar with the concepts of nuclear reactions.

TEXT BOOK(S)

1. Gopalan R, Subramaniyan PS. Rengarajan K. 1991. Elements of Analytical Chemistry, Sultan Chand & sons, 2nd edition,
2. Gowarikar VR, Viswnathan NV. Jayadevm . 2019. Polymer Science, Third edition, New Age International Publishers.
3. Kent JA, 2002. Reigels Handbook 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. Glass stone 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. Organomettalic Chemistry. New Age International
5. Saxena. PB. 2007. Inorganic Polymers, Discovery Publishing House, New Delhi.

E-RESOURCES

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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
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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: VI-MBE-IIB: Solid State Chemistry

Ins. Hrs./Week: 6

Course Credit: 5 Course Code:

OBJECTIVES

- To understand the basic concepts in supramolecular chemistry.
- To study the influence of different interactions.
- To learn the properties, reactions of magnetic materials.

UNIT- I: Basic Concepts In Supramolecular Chemistry (17 Hours)

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

UNIT –II: Organometallic Systems (19 Hours)

Combinations of different interactions to design molecular rods, triangles, ladders, networks, etc. Design of nano porous solids. Inter ligand hydrogenbonds in metal complexes.

UNIT –III: Preparative Methods in Solid State Chemistry (17 Hours)

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 (20 Hours)

Selected examples of magnetic materials, their structures and properties - Metals and alloys, Transition metal oxides, Spinels, Garnets, Ilmenites and perovskites, Magneto plumbites - Applications: structure/property relations: Transformer, Information storage, Magnetic bubble memory devices, Permanent magnets.

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

Topochemical control of solid state organic reactions: Intramolecular 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- 90

COURSE OUTCOME

The student will be able to,

1. Discuss the various types of non covalent Interactions.
2. Describe the Inter ligand hydrogenbonds in 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 photo dimerization, photo polymerization reactions.
6. Discuss the properties, reactions of magnetic materials.

TEXT BOOK(S)

1. Anthony R West. 2014. Solid State Chemistry and its Applications, Wiley, 2nd Ed, Cambridge University Press,
2. Chakrabarty DK 2021. Solid State Chemistry, New Age International Publishers, 2nd Ed,.
3. Coey JMD. 2012. Magnetism and Magnetic Material Cambridge University Press,
4. Katsuhiko Ariga, Toyoki kunitake. 2006. Supramolecular Chemistry - Fundamentals and Applications, springer,
5. Lehn J. 1995. Supramolecular Chemistry, VCH, Wienheim

REFERENCE BOOK(S)

1. Asim K Das and Mahua Das. 2020. An Introduction to Supramolecular Chemistry, CBS publishes & Distributors Pvt Ltd , 1st Ed,
2. Desiraju GR. Steiner T. 1999. The Weak Hydrogen Bond in Structural Chemistry and Biology: Oxford University press: Oxford,.
3. Jeffrey GAV. 1997. Introduction to Hydrogen Bonding, Oxford University press: New York, .
4. Lehn JM. 1999. Transition Metals in Supramolecular Chemistry: John Wiley & sons: New York, .
5. Peter J Cragg. 2011. Supramolecular Chemistry, 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 – 620 024.
FOR ALL UG 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.

UnitII 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 Safeguarding Mechanism:

In India National/State Commission for Women (NCW)-All Women Police Station-Family Court-Domestic Violence Act-Prevention of Sexual Harassment at Work place Supreme Court Guidelines-Maternity Benefit Act-Hindu Succession Act 2005-Eve Teasing Prevent Act – Self Help Groups – 73rd and 74th Amendment for PRIS.

NON MAJOR ELECTIVE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: III-NME-I: Agricultural Chemistry

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:

UNIT- I: Origin of Soil

(4 Hours)

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

UNIT II Chemistry Aspects of Soil

(7 Hours)

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 and effect on soil fertility.

UNIT III Plant Nutrients

(7 Hours)

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.

UNIT IV Fertilizers

(5 Hours)

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

UNIT V Pesticides and Fungicides

(7 Hours)

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. Fungicides: Definition – Classification – mechanism of action – copper - Bordeaux mixture, cuproban, mercury compounds – phenyl mercury acetate (PMA), Methoxyethyl mercuric chloride (MMC), sulphur - Ethylene Bis Dithiocarbamates (EBDC's), Thiocarbamates, cypermethric acid chloride.

Total Lecture Hours- 30

COURSE OUTCOME

The student Will able to,

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

TEXT BOOK(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 VS. 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, BiblioLife Publisher.

E-RESOURCES

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 > OrganicAgr...
7. <https://www.intechopen.com> > books > agricultural-che...



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAL, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2021– 2024)

DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY

Ins. Hrs./Week: 2 **Semester:** IV-NME-II: Health Chemistry
Course Credit: 2 **Course Code:**

UNIT I Health **(4 Hours)**

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

UNIT II Drugs **(7 Hours)**

Drugs - Types of drugs – depressant – Barbiturates, anticonvulsant – Carbamazepine, narcotics – morphine, antipyretics – Acetyl salicylic acid (Aspirin), antibiotics - Penicillins, antiseptics – Chlorhexidine, analgesics - Acetaminophen (Only Applications).

UNIT III Body Fluids **(7 Hours)**

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

UNIT IV Enzymes and Hormones **(6 Hours)**

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

UNIT V Common Diseases **(6 Hours)**

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. Understand 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

TEXT BOOK(S)

1. Ashutosh Kar. 1993. Medicinal Chemistry, Wiley Easterns Limited, New Delhi.
2. [Ashutosh Kar](#). 2012. Pharmaceutical Drug Analysis, New age 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. Textbook of Medicinal Chemistry Vol I, 2Ed, 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 Textbook of Medicinal Chemistry, Dreamtech 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.](#)
2. <https://www.amazon.in> > [Fundamentals-Biochemistry-A...](#)
3. <https://www.amazon.in> > [Handbook-Common-Diseases-...](#)
4. <https://www.flipkart.com> > [fundamentals-biochemistry-](#)
5. <https://www.amazon.in> > [Textbook-Pharmaceutical-Che](#)
6. <https://www.amazon.in> > [Food-Chemistry-Alex-V-Ram.](#)

