SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

**(AUTONOMOUS)**

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

SUNDARAKKOTTAI,MANNARGUDI–614016.

**TAMILNADU,INDIA.**

# B.Sc., CHEMISTRY

COURSE STRUCTURE WITH SYLLABUS UNDER CBCS

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

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**TAMILNADU, INDIA.**

## B.Sc., CHEMISTRY COURSE STRUCTURE UNDER CBCS

**LEARNINIG OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)**

(*For the candidates admitted in the academic year2022–2023*)

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

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

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

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

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

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

**CURRICULAM DESIGN**

**LIST OF ALLIED COURSES**

**ALLIED COURSE I-MATHEMATICS/BOTANY ALLIED COURSE II PHYSICS**

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

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

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

**Extension Activities shall be outside instruction hours.

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**Note:**

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

3.Separate passing minimum prescribed for CIA and ESE

**FOR THEORY**

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

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

**FOR PRACTICAL**

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

[i.e.24marks]

**NON-MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT**

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

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

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

**VALUE ADDED COURSE OFFERED BY THE DEPARTMENT**

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

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

DEPARTMENT OF CHEMISTRY

**B.Sc., CHEMISTRY**

*(For the candidates admitted in the academic year2022–2023)*

**Question Paper Pattern-(Theory)**

**Maxtime:3Hours** **MaxMarks:75**

**Section –A (10X2 =20)**
**Answer all the Questions**
**Answer in One or Two Sentences Each**

1. } UnitI
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 500words**

11. a (or) } Unit I
12. 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. UnitIII
19. UnitIV
20. Unit V

# SEMESTER III

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DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs. /Week:6** **Course Credit:5** **Course Code: 23CH305**

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

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

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

General characteristics of elements of Group IVA- allotropic forms of carbon – Chemistry of charcoal – Chemistry of oxides of carbon (CO & $CO_2$) – preparation of silicon – physical and chemical properties of Si– uses –structures of silicates–chemistry of silicones.

**UNITII INTERHALOGEN COMPOUNDS (15 Hours)**

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

**UNITIII PHENOLS (15 Hours)**

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

**UNIT IV GASEOUS STATE (15 Hours)**

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

**UNIT V SOLID STATES AND LIQUID CRYSTALS (15 Hours)**

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

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

**Total Lecture Hours : 75**

**COURSEOUTCOME**

The student will be able to,

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

**TEXTBOOK(S)**


1. AnilJElias.2019. The Chemistry of p block elements, Synthesis,Reactions and Applications,First Edition,Theorient Blackswan.
2. Arun Bahl and BS Bahl.2018.ATextbookofOrganicChemistry, 5th edition,NewDelhi,SultanChand&Co.
3. BuriBR,SharmaLRandPathaniaMS,2020.PrinciplesofPhysicalChemistry,47th edition ,Vishalpublishing Co,Punjab.
4. KalsiPS.2017.Stereochemistryconformationandmechanism,9th edition,NewAgeInternationalpublishers.
5. SatakeM.2003.The Chemistry of p block elements,First Edition,Discovery publishing Pvt,Ltd.


**REFERENCEBOOK(S)**


1. GlasstoneS,LewisD. Elements of Physical Chemistry,London, MacMillan & Co.Ltd
2. LeeJD.2006.ConciseInorganicChemistry,UK,Blackwellscience.
3. Morrison RT, Boyd RN. 2018. Organic Chemistry, 6th edition, New York, Allyn &Bacon Ltd.,
4. NasipuriD.2020.StereochemistryofOrganicCompounds,PrinciplesandApplications(Fourthedition),NewAgeinternationalpublishers.
5. PeterAtkins&Juliodepaula,2017.ElementsofPhysicalChemistry,Seventhedition,Oxford UniversityPress.
6. Puri BR Sharma,LR, KaliaKK.2020.PrinciplesofInorganicChemistry,33rd edition,VishalPublishing &Co.


**E-RESOURCES**

1. http://jpsw.shikshamandal.orgchemistryofpblockelements
2. https://wiki.ubc.ca. chemistry of p block elements
3. https;//www.khanacademy.org.stereochemistry
4. https://www.topper.comchemistryThegaseousstate
5. searchworks.stanford.edu/view/4002582

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(AUTONOMOUS)

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**: 3 **Course Credit**:3 **CourseCode**:**23CH306P**

**Organic Qualitative Analysis and Determination of Physical Constants**

**Organic Analysis**

**I Analysis of simple organic compounds**

a) Characterization of functional groups.

b) Confirmation by preparation of solid derivatives/characteristic color reactions.

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

**II Determination of physical constants**

Determination of boiling/melting point by semimicro method.

**Scheme of Evaluation**

**External:60** **Internal: 40**

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

**COURSEOUTCOME**

The student will be able to,

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

**TEXTBOOK(S)**


1. ArthurVogel.2010.Qualitative Organic Analysis.(2nd edition),Pearson education,London.
2. Bajarang BaliDr,Amarnath MisraDr, Girma.2016.Practical Instrumental Analysis.(FirstEdition),InnovativePublication.NewDelhi.
3. BhutaniSP.2009.PracticalOrganicChemistry.ANEBooks,Chennai.
4. Gnanapragasam.NS and Ramamurthy,G. Organic Chemistry Lab Manual. S.Viswanathan and Co.Pvt. Ltd.Chennai.
5. Hans Thacher Clarke. 2007. A Hand Book of Organic Analysis, (4th Edition), CBS,Chennai.


**REFERENCEBOOK(S)**


1. AhluwaliaVK.SunitaDhingrs.2000.ComprehensivePracticalOrganicChemistry.UniversityPress.
2. GopalanR.2000.ElementsofAnalyticalChemistry.S.Chand, New Delhi,
3. SatinderDr,JunejaK,AranKumarDr.2021,PracticalChemistry, S.Vinesh &Co
4. VagishCB.2018.Organicanalysis.KindleEdition.
5. Vogel's.1989.Text book of Practical Organic Chemistry,(5thedition),Prentic Hall.


**E-RESOURCES**

1. edu.rsc.org/resources/qualitative-tests-for functional group
2. wwwchem.uwimona.edu.jm/lab manuals/c10expt25.html3.
   pubs.acs.org/doi/10.1021/ac071150w
4. pubs.acs.org/doi/10.1021/acs.jchemed.0c00179
5. www.itseyeris.com/book/comprehensive-practicalchemistry

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# SEMESTER IV

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DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week:4** **Course Credit:4** **Course Code:23CH407**

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

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

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

Nomenclature, isomerism, general methods of preparations, reactions involving cleavage of C-O linkages, alkyl group and ethereal oxygen. Zeisel's method of estimation of methoxy group. Reactions of epoxides with alcohols, ammonia derivatives and LiAH4 Thioethers - nomenclature, structure, preparation, properties and uses.

## UNIT III THERMODYNAMICS I (15 HOURS)

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

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

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

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

## UNIT:V CHEMICAL KINETICS (15HOURS)

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

**Total Lecture Hours-75**

## COURSE OUTCOME

The student should able to,

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

### TEXTBOOK(S)


1. Agarwal OP, Dr.2017.Alcohols, Phenols &Ethers, Third edition, Disha publication.
2. HelenCAspinall.2020. Chemistry of f block elements (Firstedition),OUPOxford,
3. MarkJWinter.2015.D-BlockChemistry,(second edition),OUP Oxford
4. GreenMLH.2013.OrganometallicCompounds,vol2,Springer
5. Madelung.2004.Introductionto Solid State Theory,First edition,Springer India PVT Ltd.,
6. Mukesh patel,Parimal Chatrabuji. 2018.FundamentalsofChemicalKinetics, volume1,createspace


### REFERENCEBOOK(S)


1. BahlBS,Arun Bahl, 2016.A Text Book of Organic Chemistry,22nd edition,SultanChand&Co.,NewDelhi,
2. Glass toneS,LewisD. Elements of Physical Chemistry,London, Mac Milan &Co.
3. LeeJD.2006.ConciseInorganicChemistry,UK,BlackwellScience
4. Morrison RT, BoydRN.2018.OrganicChemistry. 6thedition,NewYork,Alyn&BaconLtd.,
5. Puri BR, Sharma LR, Kalia KK.2020. Principles of Inorganic Chemistry,33rd edition,VishalPublishing&Co.,


## E-RESOURCES

1. https://www.onlinelibrary.wiley.com/doi/abs/10.1002/aenm.202000280d7 f block elements
2. https://pubs.acs.org/doi/10.1021/jo00392a011organometalliccompounds
3. https://www.coursehero.com/file/92206671/ch11-alcohols-phenols-etherspptx/
4. https://pubs.acs.org/doi/10.1021/ja02254a006solidstate
5. https://learn.careers360.com/chemistry/chemical-kinetics-chapter/

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DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**: 3 **Course Credit**:3 **Course Code**:**23CH408P**

**Semi micro Inorganic Qualitative Analysis**

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

**Cations to be studied:**

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

**Anions to be studied:**

Carbonate,Sulphide,Sulphate,nitrate,chloride,bromide,fluoride,borate,oxalateandphosphate.

**SCHEMEOFEVALUATION**

**Marks Distribution for external: Practical - 50marks**

| | | | |
|---|---|---|---|
| | : Record | - | 10 marks |
| | : Total | - | 60 marks |
| 4radicalscorrect with suitable tests: | | - | 50marks |
| 3radicalscorrect with suitable tests: | | - | 40marks |
| 2radicalscorrect with suitable tests : | | - | 30marks |
| 1radicalscorrect with suitable tests: | | - | 15marks |
| Spotting | | - | 05 marks |

**COURSEOUTCOME**

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.

**TEX TBOOK(S)**


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


**REFERENCEBOOK(S)**


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


**E-RESOURCES**

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

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# SKILL BASED ELECTIVE

SBE - I

# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week:2** **Course Credit:2** **Course Code:22SBECH1**

**UNIT:I MILK** **(7hours)**

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

**UNIT:II CARBOHYDRATES & VITAMINS** **(7hours)**

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

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

**UNIT – III LIPIDS** **(6hours)**

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

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

**UNIT- IV FERMENTATION** **(5hours)**

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

**UNIT-V MILK POWDER** **(5hours)**

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

**Total Lecture Hours-30**

## COURSEOUTCOME

The student will able to,

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

## TEXTBOOK(S)


1. Ashok Kumar Agrawal,Megh GoyalR.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 Products1st edition,Jaya Publishing House
4. Rajagopal S, Roy SK. 2014. Milk and Milk Products Technology 1st edition, Vikas Publication House Pvt Ltd.
5. YoungWPark. 2013.Milk and Dairy Products in Human Nutrition, 2nd edition,Person education Ltd,New Delhi.


## REFERENCEBOOK(S)


1. AlanHVarnam,JaneP Sutherland,1994.Milk and Milk Products,Technoloy, Chemistry and Microbiology,1st edition,Springer,Boston,MA
2. FoxPF,UniavkeT.2015.Dairy Chemistry and Biochemistry, 2nd edition, Springer International Publishing Switzerland.
3. Griffiths, 2010. Improving the Safety and Quality of Milk 1st edition, Wood head Publishing.
4. RalphEarly.1998.TheTechnologyofDairyProducts2nd edition,Blackieb Academic &Professional ,London.
5. Singh,Shivashraya. 2014.Dairy Technology Milk And Milk Processing volume1,New India Publishing Agency ,New Delhi.


## E-RESOURCES

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

# NON MAJOR ELECTIVE

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE**

(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

## Semester: III -NME-I:Agricultural Chemistry

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

**UNIT- I: Origin of Soil** **(4Hours)**

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

**UNITII Chemistry Aspects of Soil** **(7Hours)**

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

**UNITIII Plant Nutrients** **(7Hours)**

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

**UNITIV Fertilizers** **(5Hours)**

Fertilizers – classification of NPK fertilizers – sources - natural and synthetic – straight – complex–liquidfertilizers,theirproperties,useandrelativeefficiency secondary and micro nutrient fertilizers–mixed fertilizers, nitrogen fixation, nitrogen cycle.

**UNITV Pesticides** **(7Hours)**

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

**Total Lecture Hours-30**

**COURSEOUTCOME**

The student Will able to ,

1. Discuss the diagnos is methods of soil
2. Understand the differ rent processing of soil.
3. Illustrate the significance of plant nutrients
4. Study the classification ,preparation and utilization of fertilizers
5. Gain Knowledge the classification,mode of action of pesticides

**TEXTBOOK(S)**


1. AjaySingh2 018.AgriculturalChemistry,Pushpanjali Prakashan publishers.
2. Biswas TD, Mukherjee SK. 1987. Text Book of Soil Science, Tata McGraw-Hil l Publishing Company.
3. BuchelKH.19 83.ChemistryofPesticides,JohnWiley &Sons NewYork.
4. Sree RamuluV S.1979.Chemistry of Insecticides and Fungicides, Oxford and IBH Publishing Co.,New Delhi.
5. Tisdale SL, Nelson WL, Beaton JD. 1990.Soil Fertility and Fertilizers, Macmillan Pub Co NewYork.


**REFE RENCE BOOK(S)**


1. DajiA.J1970.ATextBookofSoilScience,AsiapublishingHouse,Madras.
2. HesseP.R1971.ATextBookofSoilChemicalAnalysis,JohnMurray,NewYork.
3. MargaritaStoytchevaandRoumenZlatev2013.AgriculturalChemistry,Intechop en
4. ParameshwarHegdeH.2009.TextbookofAgro- Chemistry,Discovery Publishing.
5. ThomasAnderson2008. Elements of Agricultural Chemistry, Biblio Life Publisher.


E-RE SOURCES

1. *http://www.freebookcentre.net*›Chemistry›Agricultural..
2. http://www.freebookcentre.net›Elements-of-Agriculturalchemistry.
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...

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

**Semester: IV-NME-II: Health Chemistry**

**Ins.Hrs./Week**:2 **Course Credit**:2 **Course Code**:**22NMECH42**

**UNIT I Health (4Hours)**

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

**UNITII Drugs (7Hours)**

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

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

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

**UNITIV Enzymes and Hormones (6Hours)**

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

**UNITV Common Diseases (6Hours)**

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

**Total Lecture Hours-30**

**COURSE OUTCOME**

The student will be able to,

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

**TEXTBOOK(S)**


1. AshutoshKar. 1993.Medicinal Chemistry, Wiley Easterns Limited, New Delhi.
2. AshutoshKar. 2012.PharmaceuticalDrugAnalysis,Newage international publishers.
3. Deb A.C 2017, Fundamentals of Biochemistry, New Central Book Agency, Calcutta, 4th edition.
4. JainS.2008.AHandbookofCommonDiseases:Causes&Cure,VijayGoelPublishers
5. MallickP.N. 2008. Some Common Diseases and Their Treatment,Vora Medical Publications.
6. SatakeM.andMidoY.2003. Chemistry for Health Science, Discovery Publishing House,New Delhi.
7. SaurabhBhatia.2018.Introduction to enzymes and their applications, IOP PublishingLtd.


**REFERENCE BOOK(S)**


1. Alagarsamy. 2013.Text book of Medicinal ChemistryVolI,2Ed, Elsevier Science
2. AlexVRamani,2015.Food Chemistry,MJP Publishers,Chennai,Kindle edition
3. JayashreeGhosh, 1999. AText Book of Pharmaceutical Chemistry, S. Chand and Co.Ltd.
4. Munendra Mohan Varshney AsifHusain2020.AText book of Medicinal Chemistry,Dream tech Press.
5. Surendra NPandeya2009. 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.

# SEMESTERV

SENGAMALA THAYAAR EDUCATIONA LTRUST WOMEN'S COLLEGE
(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

**Semester :V-CC-V**:Inorganic Chemistry

**Ins.Hrs./Week**:5 **Course Credit**:5 **Course Code**:**R23CH509**

**UNITI Coordination Compounds–I (16Hours)**

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

**UNITII Coordination Compounds–II (16Hours)**

Theories of coordination compounds : Valence bond theory, limitations of valence bond theory, crystal field theory – splitting of d orbitals in octahedral, tetrahedral and square planarfields,CFSE,factorsaffectingCFSE,color,geometryandmagneticpropertiesofcoordination compounds,Jahn–Tellerdistortion(anelementaryidea).

Molecular orbital theory:Molecular orbital diagramfor$[Co(NH)6]^{3+}$. Ligandfield theory.(Anelementarytreatmentonly).

**UNITIII Coordination Chemistry–II (15 Hours)**

Labile and inert complexes, stability of coordination compounds – thermodynamic and kinetic stability, relationship between stepwise formation constant and overall formation constant,factor saffecting the stability of complexes.
Unimolecular and bio molecular nucleophilic substitution reactions in octahedral and square planar complexes, transeffect–theories of trans effect and applications.

**UNITIV Carbonyls and Binary Metallic Compounds (12 Hours)**

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

**UNITV Nitrosyl Compounds and Magnetic Properties (17Hours)**

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

**Total Lecture Hours-75**

**COURSEOUTCOME**

The students are able to,

1. Discuss how ligand substitution reaction takes place in octahedral and square – planar,transeffectandtransinfluenceandhowtranseffectisapplicablein 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 biologica lsystem.

**TEXTBOOK(S)**


1. DragoRS. 1992.Physical Methods in Chemistry, 3rdEd.,W.B.SaundersCompany,London,
2. GopalanR.2008.ConciseCoordinationChemistry,First edition,Vikas Publication House PvtLtd.
3. Huheey JE, Keiter EA,Keiter RL. 1993. Inorganic Chemistry Principles of Structure and Reactivity,4thEd.,Harper Collins College Publishers, New York,
4. KazuoNakamota.2019.Infrared and Raman Spectra of Inorganic and Coordination Compounds,PartAand B,6thEd.,John-Wileyand Sons,Inc.NewYork.
5. SuttonD.1968. Electronic Spectra of Transition Metal Complexes, Mc Graw Hill, Australia.


**REFERENCEBOOK(S)**


1. CottonFA,Wilkinson G.1972.Inorganic Chemistry A Comprehensive Text,3rdEd.,Interscience Publishers ,New York.
2. CrabtreeRH.2014.TheOrganometallicChemistryoftheTransitionMetals,6thEd.,John-WileyandSons Inc.,New York.
3. EbsworthEAV.1987. Structural Methods in Inorganic Chemistry,3rd Ed.,Great Britain,ELBS.
4. HousecroftCE,SharpeAG,2012, InorganicChemistry4thEd., Pearson Education Limited, Essex,
5. LeeJD,1998.Concise Inorganic Chemistry, 6thEd.,ELBS,London,
6. LewisJ,Wilkins RG,1960.Modern Coordination Chemistry,Inter science Publishers,Inc.,New York,.
7. MiesslerGL.FischerPJ,TarrDA,2014,InorganicChemistry,5thEd.,PearsonEducation,Inc.,NewYork,.


E-RESOURCES

1. https://www.britannica.com/science/coordination-compound2. https://pubs.acs.org/doi/10.1021/ic50033a014
3. https://pubs.acs.org/doi/10.1021/cr000075l
4. https://pubs.acs.org/doi/10.1021/om950697a
5. https://www.cambridge.org/core/books/magnetism-and-magnetic-materials/ad3557e2d4538caa8488a8c1057313bc

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

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**:6 **CourseCredit**:6 **Course Code:R23CH510**

**UNITI Chemistry of Carbonyl Compounds (16Hours)**

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

**UNIT II Chemistry of Carboxylic Acids (16Hours)**

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

**UNIT III Chemistry of Nitrogen Compounds (15Hours)**

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

**UNIT IV Chemistry of Heterocyclic Compounds (12Hours)**

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

**UNI TV Dyes (16Hours)**

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

**Total Lecture Hours-75**

## COURSE OUTCOME

The students are able to,

1. Recognise how different compounds are prepared by there actions of carbonyl moiety.
2. Understand the synthesis of carboxylic acids and its derivatives from different substrates.
3. Desxcribe 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. BahlBS, BahlA.2010,Advanced Organic Chemistry,12th edition,New Delhi, Sultan Chand&Co.,
2. Finar IL.2009.Organic ChemistryVol.II,7thEd.,Pearson educationLtd,NewDelhi,
3. MarchJ, Smith MB March's. 2013. Advanced Organic Chemistry Reactions, Mechanisms, and Structure, 7Ed.,Wiley,NewYork.
4. MorrisonRT, BoydRN.2018.OrganicChemistry, 6thedition,NewYork,Allyn & BaconLtd.,
5. Panico WH,PowellL, JeanC,Richer,1993.A Guideof IUPAC Nomenclature of Organic compounds.


## REFERENCE BOOK(S)


1. Arun Bahl, Bahl BS. 2018. A Text book of Organic Chemistry, 5thedition,NewDelhi,SultanChand&Co.
2. Finar IL. 1996.Organic Chemistry, Vol 1 & 2, 6th edition, England, Addison WesleyLongmanLtd.
3. Morrison RT, Boyd RN, Bhattacharjee SK. 2 0 1 4 . Organic Chemistry 7thedition, PearsonIndia,
4. Pine SH. 1987. Organic Chemistry, 5th edition. New Delhi, McGraw – HillInternationalBookCompany.
5. Seyhan N Ege. 2005. Organic Chemistry, 5th edition, New York, Houghton MifflinCo.


## 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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SENGAMALATHAYAAREDUCATIONALTRUSTWOMEN'SCOLLEGE
(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**:6 **Course Credit**:6 **Course Code**:**R23CH511**

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

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

**UNIT–II:Thermodynamics-I (16 Hours)**

Definitions- systems and surroundings -isolated, closed and open system – state of the system-intensive and extensive variables.Thermodynamic processes-reversible and irreversible and Isothermal and adiabatic processes-state and path function.Work of expansion at constant pressure and at constant volume.First law of thermodynamics–statement-definition of internal energy(E), enthalpy (H)and heat capacity.Relationship between Cp and Cv. 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 enthaply of reaction at constant volume (qv) and at constant pressure (qp) – temperature dependance of heat reaction

**UNIT–III:Thermodynamics-II (15Hours)**

Second law of thermodynamics- need for the law-different statement of the law - Carnot's Cycle and efficiency of heatengine-Carnot'stheorem-thermodynamicscaleoftemperature.Concept of entropy -definition and phyiscal siginificance 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.Gibb's free energy(G) and Helholtz free energy (A) – variation of A and G with P, V and T - Gibb's –Helmholtz equation and its applications.Thermodynamic equation of state,Maxwell's relations -ΔA and Δ Gas criteria for spontaneity and equilibrium.

**UNIT-IV:Thermodynamics-III (12Hours)**

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

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

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

**UNIT–V:Solutions and Phase Changes** **(17Hours)**

Raoult'slaw,Henry'slaw,Ideal and non –Ideal solutions,Completely miscible liquid systems – benzene and toluene. Partially miscible liquids – Phenol - Water, Triethyl amine - WaterandNicotine-Watersystems.LowerandupperCSTs– effectofimpuritiesonCST.Completelyimmiscibleliquids. Definition of terms in the phase rule– derivation and application to one component system-water and sulphur system–supercooling, sublimation.

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

**TotalLectureHours-75**

**COURSE OUTCOME**

The students are able to,

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

**TEXT BOOK(S)**


1. ArunBahlBSBahlandGD, Tuli, 2014. EssentialsofPhysicalChemistry, NewDelhi.S.Chand&CompanyPvt.Ltd,
2. Grudeepraj.2020.AdvancedPhysicalChemistry. KrishnaPrakashanMedia,Meerut,UP.
3. NicholasJTurro,RamamoorthyV,Scaiano JC.2019.PrinciplesofmolecularSpectroscopy.Viva BooksPrivateLtd,Chennai.
4. RajputRK. 2017. ATextbookofEngineeringthermodynamics(5thedition), Laxmipublications,NewDelhi.
5. Rastogi RP, Misra RR. 2018. An Introduction to Chemical Thermodynamics. 6threvisedEd,VikasPublishingHouse Private Ltd,Noida,UP.


**REFERENCE BOOK(S)**


1. AtkinsPW1994.PhysicalChemistry,5thedition,OxfordUniversityPress,India
2. Glass stone S, Lewis D. Elements of Physical Chemistry, Mac Millan & Co LtdLondon.
3. PuriBR,SharmaLRPathaniaMS.2013,PrinciplesofPhysicalChemistry,35theditio n,ShobanLalNaginChandandCo,NewDelhi.
4. RajaramJ,KuriacoseJC.1986.Thermodynamicsfor students ofchemistry,LalNaginChand,NewDelhi.
5. SamuelGlassstone,1974.Thermodynamics forChemists, 3rdedition, East-WestPublishers,America.
6. SangaranarayananMV,MahadevanV.2011.TextBookofPhysicalChemistry,2ndEditio n,Hyderabad,Universities Press,India.


**E-RESOURCES**

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

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

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# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

**Semester:V-CP-V**:Physical Chemistry Practical

**Ins.Hrs./Week**:3 **CourseCredit**:3 **Course Code**:**R23CH512P**

**List of Experiments:**

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

**Scheme of evaluation:**

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

**COURSE OUTCOME**

The students are able to,

1. Understand the molecular weight,TT,CSTand rate constant ared etermined.
2. Understand the determination of Partition Coefficient of iodine between water and carbontetra chloride.
3. Observe the conductometric titaration and potentiometric titrations which can be determined.
4. Design and carry out scientific experiments as wel as accurately record and analyze
5. Solving problems, critical thinking and analytical reasoning.

**TEXT BOOK(S)**


1. AbbotD. 1965.PracticalPhysicalChemistryLittlehamptonBookservicePvtLtd.
2. Gupta,Renu.2017.PracticalPhysicalChemistryNewageinternationalPublisher,Chennai.
3. MoahmadAbdelfattah. 2018.PracticalPhysicalChemistryLambertAcademicPublishing,
4. SindhuPS.2009.Practicals inPhysicalChemistryLaxmiPublications,Chennai.
5. ViswanathanB,RaghavanPS. 2012. Practical Physical Chemistry Viva books,Chennai.


**REFERENCE BOOK(S)**


1. AlexanderFindlay.2016.PracticalPhysicalChemistry,WentworthPress.London.
2. Findlay's 1985. Practical Physical Chemistry, Revised and edited by B.P. Levitt 9$^{th}$ed.,Longman,London,
3. GurturJN.KapoorR.AdvancedExperimentalChemistry,Vol.I. Chand&Co.,Ltd,NewDelhi.
4. Saroj Kr Maity, Naba KR Ghosh. 2012. Physical Chemistry Practical, New central bookAgency.
5. YadavJB.2021.AdvancedPracticalPhysicalchemistry,38$^{th}$edn.GoelpublishingHouse,KrishnaPakashanMediaLtd.,


**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

## DEPARTMENTOFCHEMISTRY

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

**Ins.Hrs./Week**:4 **Course Credit**:3 **Course Code**:**R23MBECH1:2**

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

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

**UNIT–II:Magnetic Materials (12Hours)**

Ferrites : Preparations and their applications in microwaves – floppy disc – magnetic biblememory and applications. Insulating materials – classification on the basis of temperature – polymerinsulatingmaterialsandceramicinsulatingmaterials.Ferroelectricmaterials:examples – application of ferroelectrics.

**UNIT–III:Modern EngineeringMaterials (16Hours)**

Metallic glasses – introduction – composition, properties and applications. Shape memory alloys:introduction– examples– applications of SMA– advantages and disadvantages.

Biomaterials:Introduction–metalsandalloysinbiomaterials–ceramicbiomaterials,composite biomaterials–polymer biomaterials.

**UNIT- IV:Nano phase Materials (12Hours)**

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

**UNIT–V:Nano Technology (12Hours)**

Introduction–importance–variousstagesofnanotechnology–nanotubetechnology-nanoparticles-fullerenes- nano dendrimers - nano pore channels, fibers and scaffolds - CVDdismondtechnology-FCVAtechnologyandit'sapplications–nanoimagingtechniques.

**TotalLectureHours-60**

## COURSE OUTCOME

The students are able to,

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

## TEXT BOOK(S)


1. GeoffreyA,Ozin AndreC,Arsenault. 2006. AChemicalApproachtoNanomaterials,1st edition,RSCpublications.
2. Kennethklabunde, GlebSergeev. 2013.TextBookofNanochemistry, 2ndEdition,Elseiver.
3. NabokA.2005.OrganicandInorganicNanostructures,1st edition,ArtechHouse,Bosto n.
4. RaoCN, Cheetham AK. 2004. The Chemistry of Nanomaterials 1st edition, wileypublications.
5. Rietman EA. 2001. Molecular Engineering of Nanosystems, 1st edition, Springer - Verlag,NewYork.


## REFERENCE BOOK(S)


1. Aathony R West. 1989. Solid State chemistry and its applications, 1st edition, JohnWileyandsonsPublication.
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. JohnWileyandsons,inc.Publications.
4. PradeepT.2007.NanoTheEssentialsinUnderstandingNanoscienceandNan otechnology;1stEd.,Tata McGraw Hill,NewYork.
5. RagavanVR. 2001.MaterialsScienceandEngineering, PrinticeHall(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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**Semester:V-MBE-I**:Analytical Chemistry

**Ins.Hrs./Week**:4 **Course Credit**:3 **Course Code**:**R23MBECH1:1**

**UNIT- I: Laboratory Hygiene and Safety (12 Hours)**

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

**UNIT–II:Data Analysis (12Hours)**

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

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

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

**UNIT-IV: Visible Spectrophotometry and Colorimetry (12Hours)**

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

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

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

**TotalLectureHours-60**

**COURSE OUTCOME**

The students are able to,

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

**TEXT BOOK(S)**


1. Douglas A Skoog,DonaldMWest, FJHoller,2009.FundamentalsofAnalyticalChemistry,7th edition,Harcourtcollegepublishers.
2. Gopalan R, SubramaniyanPSand RengarajanK.1993. ElementsofAnalyticalChemistrysecondrevisededition,Sultanchand.
3. GuptaSC.2018. FundamentalsofStatistics,6thEd.,HimalayaPublications,Delhi,
4. HarrisDC.1995. QuantitativeChemicalAnalysis,4thEd.,W. H.FreemanPublications,NewYork.
5. Hibbert DB,GoodingJJ.2006.DataAnalysisforChemistry,OxfordUniversityPress,UK.


**REFERENCE BOOK(S)**


1. GurdeepRChatwal,ShamKAnand.2005.InstrumentalMethodsofChemicalAnalysis,HimalayapublishingHouse.
2. MendhamJ,DennyRC,BarnersJD.ThomasMVogels.2007.TestBookofQuantitative ChemicalAnalysis,6th edition,Pearsoneducation.
3. SharmaBK.1997.InstrumentalMethodsofChemicalAnalysis,Goelpublishinghouse,Meerut
4. Skoog DA,WestDM,Holler DJ.2004. Fundamentals of Analytical Chemistry,7thEd.,HarcourtCollegePublishers,Singapore.
5. Valcarcel Cases Miguel, López Lorente Àngela I, López Jiménez M Àngeles. 2008.Foundations of Analytical Chemistry, A Teaching–Learning Approach, Springer. DOI10.1007/978-3-642-57157-2.


**E-RESOURCES**

1. http://ndl.iitkgp.ac.in/document/bnZnR2hPaUVqRU9TbFc2Rmp1MVJzMDFQWHVwTENHaVhxb2h6bnpCWHMzYz0
2. http://www.freebookcentre.net/chemistry-books-download/Analytical-Chemistry-Vol.-1-(PDF).html.
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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# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

**Semester:V-SBE-II**:Textile Chemistry

**Ins.Hrs./Week**:2 **Course Credit**:2 **Course Code**:**R23SBECH2**

**UNITI Classification of Fibres** **(5Hours)**

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

**UNITII Structure and Properties of Fibres (7Hours)**

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

**UNITIII Impurities of Fibres** **(5Hours)**

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

**UNIT IV Dyeing** **(6 Hours)**

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

**UNIT V Finishing** **(7Hours)**

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

**Total Lectures Hours-30**

**COURSE OUTCOME**

The students are able to,

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

**TEXT BOOK(S)**


1. Hall.A.J, 2009.TextbookofTextileScience1st edition, DorlingKindersley(India)Pvt.Ltd.,NewDelhi.
2. KapurK.2010. TextBookofAppliedChemistry,3rd edn,wileypublications.
3. Thomas Bechtold and Tung Pham, 2019. Textile Chemistry, 1stedn,Springer-Verlag,NewYork
4. Vishu Arora.2011.TextileChemistry,1stedition,ArtechHouse,Boston.
5. VatsalaR. 2009.TextbookofTextiliesandClothing, 1stedn,AtlanticPublishersandDistributors.


**REFERENC EBOOK(S)**


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


**E-RESOURCES**

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

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# SENGAMALA THAYAA REDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

**Semester:V-SBE-III**:Polymer Chemistry

**Ins.Hrs./Week**:2 **Course Credit**:2 **Course Code**:**R23SBECH3**

**UNITI Basic Concepts in Polymers (6Hours)**

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

**UNITII Polymerization Techniques (5 Hours)**

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

**UNITII ICharacterisation of Polymers (7Hours)**

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

**UNITIV Polymer Degradation (7Hours)**

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

**UNITVCompounding and Fabrication(5 Hours)**

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

**TotalLecturesHours-30**

**COURSE OUTCOME**

The students will be able to,

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

**TEXT BOOK(S)**


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


**REFERENCE BOOK(S)**


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


**E-RESOURCES**

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

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## Soft Skills Development

**Learning Objective**

**Today's world is all about relationship, communication and presenting oneself, one'sideas 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-mailetiquette.**

**Unit IV**

**Corporate Skills/Working with Others**
**Developing body language-Practising etiquette and mannerism-Time mamagement-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 ond evelopment of Soft Skills Dr.K.Meena& Dr.V.Ayothi**
**Soft Skills.Dr.K.AlexS.Chand &Company Ltd.RamNagar,NewDelhi-110 055**

**Reference Books**

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

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# SEMESTERVI

# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**:6 **Course Credit**:6 **Course Code**:**R23CH613**

**UNIT I Chemistry of Carbohydrates (15Hours)**

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

**UNITII Chemistry of Proteins and Vitamins (15Hours)**

Amino acids - Classification – Zwitter ion – iso eletric point - preparation and reactions of amino acids. Peptides - Peptide linkages – proteins - classification of proteins - Structure of proteins - primary structure - end group analysis - Edman method - secondary structure - tertiarystructure-denaturation-colourreactionsofproteins.Vitamins-classification,structure and biological importance of vitamins A,$B_1$and C.

**UNIT III Chemistry of Alkaloids and Terpenoids (15Hours)**

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

**UNIT IV Molecular Rearrangements (15Hours)**

Molecular rearrangements-types of rearrangement (nucleophilic and electrophilic)–mechanism with evidence for the following re-arrangements: pinacol–pinacolone.

Benzil - benzilic acid, benzidine, Claisen, Fries, Hofmann. Curtius, Lossen, Beckmann and dienone–phenol rearrangements.

**UNITV Organic Spectroscopy (15Hours)**

UV-VIS spectroscopy-types of electronic transitions–Instrumentation-solvent effects on $\lambda$ max - Woodward - Fieser rules for calculation of $\lambda$max : dienes only – bathochromic shift and Hypochromic shift.

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

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

**TotalLecturesHours-75**

## COURSE OUTCOME

The students are able to,

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

## TEXTBOOK(S)


1. Jerry March. 2004. Advanced Organic Chemistry – Reaction MechanismsandStructure,JohnWiley,NewYork,
2. LowryTHE,RichardsonKS.1998. MechanismandTheoryinOrganicChemistry,Addison-Wesley,USA,
3. MorrisonRT,BoydRN.2011.OrganicChemistry, 7thEd., Pearson,NewDelhi,
4. WebsterRM,SilversteinF.2015.SpectroscopyidentificationofOrganiccompounds,edition,CRCPress,
5. WilliamKemp.OrganicSpectroscopy,3rdedition,ELBS.


## REFERENCEBOOK(S)


1. BahlBS, BahlA. 2010. AdvancedOrganicChemistry, 12thedition,NewDelhi,SultanChand& Co.,
2. FinarIL.1996.Organic Chemistry,Vol1&2,6thedition,addisonWesleyLongmanLtd.,England,
3. MorrisonRT, BoydRN, BhattacharjeeSK. 2011.OrganicChemistry7thedition,Pearson,India.
4. PaviaDL,LampmanGM, KrizGSVyvyan,J.A.,2015.IntroductiontoSpectroscopy5thedition,CengageLearning,
5. PineSH.1985.OrganicChemistry,5thedition,McGraw–HillInternational BookCompany,NewDelhi.
6. Seyhan N Ege. 2 0 0 5 . Organic Chemistry, 5th edition, Houghton Mifflin Co., NewYork.


## 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_16scccch8_2020051904202312.pdf.
4. http://www.chem.iitb.ac.in/~kpk/ra.pdf
5. https://www.lehigh.edu/~kjs0/carey-13.pdf.

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# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI- 614016**

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

**DEPARTMENT OF CHEMISTRY**

B.Sc., CHEMISTRY

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

**Ins. Hrs./Week**: 6 **Course Credit**: 6 **Course Code**:**R23CH614**

**UNIT-I:Electrical Conductance (15Hours)**

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

**UNIT –II:Electrochemical Cells (15Hours)**

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

**UNIT–III:Catalysis and Surface Phenomena (15Hours)**

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

**UNIT-IV:Spectroscopy- I (15Hours)**

Electromagnetic spectrum-the region of various types of spectra. Microwave spectroscopy - Rotational spectra of diatomic molecules treated as a rigid rotator, Condition for molecule to be active in microwave region. Rotational Constants (B) and selection rule for rotational transition. Frequency of spectral lines calculation of internuclear distance in diatomic molecules.
Infrared spectroscopy – vibrations of diatomic molecules-harmonic oscillators, Zero point energy, dissociation energy and force constant, condition for molecule to be active in the IR region, selection rule for vibrational transition, fundamental bands, overtones and hot bands.

**UNIT–V: Spectroscopy – II** **(15Hours)**

Raman spectroscopy- Rayleigh scattering and Raman scattering.Stokes and antistokes line in Raman spectra, Raman frequency, quantum theory of Raman effect, Conditions for a molecule to be Raman active. Comparision of Raman and IR Spectra- Structural determination from Raman and IR spectroscopy, Mutual exclusion principle. NMR Spectroscopy-nuclear spin condition for a molecule to give rise to NMR spectrum- theory of NMR spectra, number of NMR signals, equivalent and non-equivalent protons. **Total Lectures Hours- 90**

## COURSE OUTCOME

The students will be able to,

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

## TEXT BOOK(S)


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


## REFERENCE BOOK(S)


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


## E-RESOURCES

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

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

**Ins.Hrs./Week**:6 **CourseCredit**:3 **CourseCode**:**R23CH615P**

**GRAVIMETRICANALYSIS:**

1. Estimation o fLead 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.

| **SchemeofValuation:** | | **Max.Marks** |
|---|---|---|
| Internal | | 40Marks |
| External | | 60Marks |
| Record | | 10Marks |
| ProcedureWriting | | 5Marks |
| **Results** | | |
| <2% | - | 45Marks |
| 2-3% | - | 35Marks |
| 3-4% | - | 25Marks |
| >4% | - | 15Marks |

**COURSE OUTCOME**

The students are able to,

1. Understand how to estimate the amount of ions during Gravimetric Analysis technique.
2. Work with modern synthetic reactions will illustrate the importance of gravimetricanalysis
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.ArkosePress,NewDelhi.
2. Nicholas Knight. 2016.A Coursein Quantitative Chemical Analysis Gravimetric and Volumetric.LeopoldClassic Library.Austrlia.
3. Pandey OP,Bajpai DN,Giri SDr. 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,NewDelhi.
5. Vogel, A.I. 2000.Text Book of Quantitative Inorganic Analysis; 6 thEd.,Longman,

**REFERENCE BOOK(S)**

1. John CharlesOlsen. 2010.Text Book of Qunatitative Chemical Analysis. Nabu Press,
2. Shikha Gulati,Sharma.JL. Shagun Manocha. 2017.Practical Inorganic Chemistry.CBS Publisher,Chennai.
3. Henry Morton, Alfert.R.2015.TheStudents Practical Chemistry.Palala Press.

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

**E-RESOURCES**

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

# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI, MANNARGUDI -614016**

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

DEPARTMENT OF CHEMISTRY

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

**Ins.Hrs./Week**:5 **Course Credit**:3 **CourseCode**:**R23MBECH2:1**

## UNIT-I: Nuclear Chemistry I (15Hours)

Introduction, nuclear structure – composition of the nucleus, subatomic particles, nuclear forces, nuclear stability – mass defect and binding energy, whole number rule and packing fraction, n-p ratio, odd even rules – liquid drop and shell models,isobars,isotones and isomers.
Isotopes – detection, physical and chemical methods of separation, isotopic constitution of elements-Radioactivity – introduction – radioactive emanations- characteristics of α, β and gamma rays,

## UNIT–II: Nuclear Chemistry II (15Hours)

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

## UNIT–III:Metallic State (15 Hours)

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

## UNIT-IV:Inorganic Polymers (15Hours)

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

## UNIT–V:Industrial Chemistry (15Hours)

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

Safety matches-Introduction,raw materials and manufacturing methods.Paints and varnishes : Definitions, types and compositions. Glass: Composition, manufacture, types and uses.
Cement:manufacture,Wet and Dry processes, composition and setting of cement.

**TotalLecturesHours-75**

## COURSE OUTCOME

The students are able to,

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

## TEXT BOOK(S)


1. GopalanR, Subramaniyan PS. Rengarajan K. 1991.Elements of Analytical Chemistry,Sultan Chand&sons,2nd edition,
2. GowarikarVR,ViswnathanNV.Jayadevm.2019.PolymerScience,Third edition,New Age International Publishers.
3. KentJA,2002. Reigels Hand book of Industrial Chemistry,9thedition,Reigels publications
4. Madhan, RD. 1987. Text Book of Modern Inorganic Chemistry, 2nd edition, S.Chand &CompanyLtd.,
5. SoniPL,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 HillIntl Book Company
2. GlassstoneS.1967.Source Book on Atomic Energy,East-westpress.
3. HeatonCA. An introduction to Industrial Chemistry, Springer Science &Business Media.
4. MehrotraRC.2007.OrganomettalicChemistry. New Age International
5. Saxena.PB.2007.InorganicPolymers,Discovery Publishing House,New Delhi.


## E-RESOURCES

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

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# SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

**SUNDARAKKOTTAI,MANNARGUDI-614016**

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

## DEPARTMENT OF CHEMISTRY

B.Sc.,CHEMISTRY

**Semester: VI- MBE-II**:Solid State Chemistry

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

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

Concepts and Languages of supramolecular chemistry. Various types of non-covalent interactions.Hydrogenbonds, C-H…X interactions, Haloge nbonds. π–π interactions,Non – bonded interactions.Various types of molecular recognition**.**

**UNIT–II: Organometallic Systems (15Hours)**

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

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

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

**UNIT-IV: Magnetic Materials (15Hours)**

Selected examples of magnetic materials, their structures and properties - Metals and alloys,Transition metal oxides, Spinels, Garnets, Ilmenites and perovskites, Magneto plumbitesApplications:structure/propertyrelations:Transformer,Informationstrorage,Magnetic bubblememorydevices,Permanentmagnets.

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

Topochemical control of solid state organic reactions: Intra molecular reactions: conformational effects, Intermolecular reactions :molecular packing effects, Photodimerization of o-ethoxy-trans-cinnamic acid (αform ,βform, γform),Photopolymerizations of diacetylenes.

**TotalLecturesHours-75**

**COURSE OUTCOME**

The students are able to,

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

**TEXT BOOK(S)**

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

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

**REFERENCE BOOK(S)**

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

**E-RESOURCES**

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

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**Bharathidasan University**

**Tiruchirappalli–620024.**

# FORALLUG COURSES

## Gender studies

**Objectives**

- **To make boys and girls aware of each other strengths and weakness**
- **To develop sensitivity towards both genders in order to lead anethically enriched life.**
- **To promote attitudinal change towards agender balanced ambience and Women empowerment.**

**Unit I Concepts of Gender:**

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

**Unit II Women's Studies Vs Gender Studies:**

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

**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-MainstreamingGlobalPolicies.**

**Unit V Women's Movements and Safe guarding Mechanism:**

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

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