B.Sc., CHEMISTRY (2017- 2018)

Sl. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for passing			Hours Week	Credits
					CIA	E.E.	Total	CIA	E.E.	Total		
1	I	Part –I	17U1CHT1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2		Part - II	17U1CHE1	English - I	25	75	100	10	30	40	6	3
3		Core	17U1CHC1	General Chemistry – I	25	75	100	10	30	40	7	5
4			17U1CHCP1	Volumetric Analysis practical	40	60	100	16	24	40	3	3
5		Allied	17U1CHMAA1/ 17U1CHZOA1	Allied Mathematics –I Allied Zoology–I	25 25	75 75	100 100	10 10	30 30	40 40	5/ 5	3/ 4
			17U2CHMAA2/ 17U2CHZOAPL	Allied Mathematics -II (NS) Allied Zoology Practical (NS)	- -	- -	- -	- -	- -	- -	3/ 3	-
6		ES	17U1CHES	Environmental Studies	-	100	100	-	40	40	-	1
7	II	Part – I	17U2CHT2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8		Part – II	17U2CHE2	English – II	25	75	100	10	30	40	6	3
9		Core	17U2CHC2	General Chemistry – II	25	75	100	10	30	40	6	5
10			17U2CHCP2	Organic qualitative analysis and physical constants	40	60	100	16	24	40	3	3
11		Allied	17U2CHMAA2/ 17U2CHZOAP	Allied Mathematics – II (NS) Allied Zoology-Practical (NS)	25 40	75 60	100 100	10 16	30 24	40 40	3/ 3	4/ 2
12			17U2CHMAA3 17U2CHZOA2	Allied Mathematics – III Allied Zoology – II	25 25	75 75	100 100	10 10	30 30	40 40	5/ 6	3/ 4
13		VBE	17U2CHVE	Value Based Education	25	75	100	10	30	40	-	-
14		SBE	17U2CHS1	Skill Based Education I Textile Processing	25	75	100	10	30	40	1	1
15	III	Part –I	17U3CHT3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
16		Part – II	17U3CHE3	English – III	25	75	100	10	30	40	6	3
17		Core	17U3CHC3	General Chemistry - III	25	75	100	10	30	40	5	5
18		Core	17U3CHC4	Agricultural Chemistry	25	75	100	10	30	40	3	3
		Core Practical	17U4CHCP3	Inorganic Qualitative Analysis Practical (NS)	-	-	-	-	-		2	-
19		Allied	17U3CHPHA1	Allied Physics – I	25	75	100	10	30	40	5	4
		NS	17U4CHPHAP	Allied Physics Practical (NS)	-	-	-	-	-	-	3	-
20		GS	17U1CHGS	Gender Studies	-	100	100	-	40	40	-	-

Sl. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for passing			Hours Week	Credits
					CIA	E.E.	Total	CIA	E.E.	Total		
21	IV	Part –I	17U4CHT4/H4	Tamil – IV / Hindi – IV	25	75	100	10	30	40	6	3
22		Part – II	17U4CHE4	English – IV	25	75	100	10	30	40	6	3
23		Core	17U4CHC5	General Chemistry – IV	25	75	100	10	30	40	6	5
24			17U4CHCP3	Inorganic Qualitative analysis practical (NS)	40	60	100	16	24	40	3	3
25		Allied	17U4CHPHA2	Allied Physics – II	25	75	100	10	30	40	5	4
26			17U4CHPHAPL	Allied Physics Practical (NS)	40	60	100	16	24	40	3	2
27		SBE	17U4CHS2	Skill Based Education-II Practical on Textile Processing	25	75	100	10	30	40	1	1
28	V	Core	17U5CHC6	Organic Chemistry – I	25	75	100	10	30	40	5	6
29			17U5CHC7	Physical Chemistry – I	25	75	100	10	30	40	5	6
30			17U5CHC8	Inorganic Chemistry -I	25	75	100	10	30	40	5	6
31			17U5CHCP4	Physical Chemistry Practical	40	60	100	16	24	40	3	4
32		Major Elective-I	17U5CHEL1A 17U5CHEL1B	Pharmaceutical Chemistry Polymer Chemistry	25	75	100	10	30	40	4	4
33		Major Elective-II	17U5CHEL2A 17U5CHEL2B	Analytical Chemistry Bio Chemistry	25	75	100	10	30	40	5	3
34		SSD	17U5CHSSD	Soft Skill Development	-	-	-	-	-	-	1	-
35		NME	17U5CHNME	Non - Major Elective Chemical aspects in Agriculture	25	75	100	10	30	40	2	1
36	VI	Core	17U6CHC9	Organic Chemistry – II	25	75	100	10	30	40	5	6
37		Core	17U6CHC10	Physical Chemistry –II	25	75	100	10	30	40	5	6
38		Core	17U6CHC11	Inorganic Chemistry – II	25	75	100	10	30	40	5	5
39		Core Practical	17U6CHCP5	Gravimetric and Organic preparation practical	40	60	100	16	24	40	5	5
40		Major Elective-III	17U6CHEL3A 17U6CHEL3B	Industrial Chemistry / Food Chemistry	25	75	100	10	30	40	4	4
41		Major Elective-IV	17U6CHEL4A 17U6CHEL4B	Dye Chemistry / Clinical Chemistry	25	75	100	10	30	40	4	3
42		GK	17U6CHGK	General Knowledge	-	100	100	-	40	40	1	-
43		CN	17U6CHCN	Comprehensive Test	-	100	100	-	40	40	1	1
				Extension Activities	-	-	-	-	-	-	-	1
				Total			**4300**				**180**	**140**

B.Sc., CHEMISTRY (2017 - 2018)

Paper Code	Total No. Of Papers	Total Marks	Total Credits	Classification
Part - I	**04**	**400**	**12**	√
Part – II	**04**	**400**	**12**	√
Part – III Core Allied Major Elective	 16 06 04 **26**	 1600 600 400 **2600**	 76 20 14 **110**	√
Part – IV Environmental Studies Value based education Skill Based Elective Gender studies Non Major Elective Soft skill development G.K Comprehensive Test	 1 1 2 1 1 1 1 1 **9**	 100 100 200 100 100 100 100 100 **900**	 1 -- 2 -- 1 -- -- 1 **05**	√
Part – V	**Extension Activity**		**1**	X
Total	**43**	**4300**	**140**	√

A.VEERIYA VANDAYAR MEMORIAL SRI PUSHPAM COLLEGE (AUTONOMOUS),
POONDI, THANJAVUR DIST.

Question Pattern for UG and PG Programmes for students to be admitted during 2017 – 2018 and afterwards

Total Marks: 75

QUESTION PATTERN

SECTION – A
(Question 1 to 10)

10 x 2 = 20 Marks

1. Short Answer Questions
2. Two Questions from each units (All are answerable)

SECTION – B
(Question 11 to 15)

5 x 5 = 25 Marks

1. 5 Paragraph type questions with "either / or" type choice.
2. One question from each unit of the Syllabus.
3. Answer all the questions.

SECTION – C
(Question 16 to 20)

3 x 10 = 30 Marks

1. 5 Essay type questions – any three are answerable.
2. One questions from each unit of the Syllabus.

பருவம்	பாடக்குறியீடு	தாளின் பெயர்	பயிற்சியின் நேரம் / வாரம்	சிறப்பு மதிப்பீடு
I	17U1____T1	**இக்கால இலக்கியம் (செய்யுள், உரைநடை, சிறுகதை, புதினம், நாடகம்,)**	6	3

கூறு: 1 செய்யுள் **நேரம்: 18**

1. இராமலிங்க அடிகளார் - திருவருட்பா - இறைத் திருக்காட்சி —1—10
2. பாரதியார் - தேசியகீதம் : பாரத தேசம் — எங்கள் நாடு,
3. பாரதிதாசன் - புதிய உலகம்: உலக ஒற்றுமை —பேரிகை, தளைஅறு, மானுட சக்தி
4. பட்டுக்கோட்டை கல்யாண சுந்தரம் -காடு வெளையட்டும் பெண்ணை ,
5. நாமக்கல் கவிஞர் - என்றுமுளதென்றமிழ் ,
6. கவிமணி : ஒற்றுமையே ,உயர்வு நிலை—நாட்டுக்குழைப்போம்

கூறு: 2 உரைநடை **நேரம்: 18**

1. கேட்டிவி - இராகபாவம் (1 முதல் 15 வரை)
2. கேட்டிவி - பயணங்கள் தொடரும்

கூறு: 3 சிறுகதை **நேரம்: 18**

1. கேட்டிவி - குரல் கொடுக்கும் வானம்பாடி (1 முதல் 10 வரை)
2. கேட்டிவி - மனோரஞ்சிதம் முழுவதும்

கூறு: 4 புதினம் **நேரம்: 18**

1. கு.வெ.பாலசுப்பிரமணியம் —காளவாய்

கூறு: 5 நாடகம் , இலக்கிய வரலாறு **நேரம்: 18**

1. கலைவாணன் — கு.சா.கிருஷ்ணமூர்த்தி(NCBH வெளியீடு)
2. சிறுகதை, புதினம், நாடகம், கவிதை, உரைநடை

பயன்கள்

சமீபகால தமிழ் இலக்கியம் பற்றி தெரிந்து கொள்ளுதல்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**17U1 _ E1**	**PART – II PROSE, POETRY AND COMMUNICATION SKILLS**	**6**	**3**

Objective

- To initiate the Students to understand English through Prose, Poetry and Basic Communicative Grammar.

Unit – I

Shakespeare - Shall I compare thee to a Summer's Day?
John Milton – On His Blindness.
William Wordsworth – The Solitary Reaper
P.B.Shelley – Song to the Men of England.
Robert Frost – The Road not Taken
Nissim Ezekiel - Night of the Scorpion

Unit – II

1) The Running Rivulets of Man,
2) Parliament is Marking Time,
3) The Lady in Silver Coat,
4) Mr. Applebaum at Play.

Unit – III

1) The Feigning Brawl of an Imposter,
2) Thy Life Is My Lesson,
3) Solve The Gamble,
4) The Stoic Penalty.

Unit – IV

1) Nobility In Reasoning,
2) Malu the Frivolous Freak,
3) Bharath! Gird Up Your Loins!
4) Honesty is the Cream Of Chastity

Unit – V

Parts of Speech, Nouns, Pronouns, Conjunctions, Adjectives, Articles, Verbs, Adverbs, Interjection – sentence.

References Book:

A Melodious Harmony – Sri.KTV, Rajendra Publishing House, Poondi, 2017.
Flying Colours – Prof. K.Natarajan, New Century Book House (P) LTD., 2017.

Course Outcome

To initiate the Students to understand English through Prose, Poetry and Basic Communicative Grammar.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
I	**17U1CHC1**	**General Chemistry – I**	**7**	**5**

Unit - I

Atomic structure: Shapes of atomic orbitals, - principal, azimuthal, magnetic and spin quantum numbers and their significance-Pauli's exclusion principle, Aufbau Principle, (n+l) rule Hund's rule, stability of half-filled and completely filled orbitals.

Periodic properties: Description - - variation of atomic volume, atomic & ionic radii, ionisation potential, electron affinity , electronegativity and metallic characters along the periods and in groups -factors influencing the periodic properties. Pauling's and Mulliken's Scales of electro negativity. classification of elements as s-,p-,d- and f- block elements.

Unit - II

Basic concepts in organic chemistry: Sigma and pi bonds– Concept of hybridization – Structure of organic molecules based on sp^3, sp^2 and sp hybridization. Covalent bond properties of organic molecules*:* Bond length, bond energy, bond polarity, dipolemoment - inductive, mesomeric, electromeric, resonance and hyperconjugative effects. Naming of alkanes (up to 10 carbon systems) – functional groups - mono functional and bi-functional compounds - Structural isomerism with appropriate examples.

Unit - III

Alkanes: sources of alkanes – General methods of preparations - chemical properties with mechanism of free radical substitution for halogenation.

Cycloalkanes: Preparation and properties – ring opening reactions - conformational study of ethane ,n-butane and cyclohexane - relative stability of cycloalkanes – Bayer's Strain theory & its limitations.

Unit - IV

Atomic structure and basic quantum mechanics: Electromagnetic radiation - characteristics of wave - Black body radiation and Planck's quantum theory - photo electric effect– Compton effect - De Broglie hypothesis and de Broglie equation - Davisson and Germer experiment. Heisenberg's uncertainty principle -. Schrödinger wave equation . Physical significance of Ψ(psi) function. –Nodal planes and nodal points in atomic orbitals.

Unit - V

TITRIMETRIC METHODS OF ANALYSIS

General principle. Types of titrations. Requirements for titrimetric analysis. Concentration systems: equivalent weight, Molarity - Normality - problems. Primary and secondary standards, criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, endpoint and equivalence point.

Acid-base Equilibria pH of strong and weak acid solutions. Buffer solutions. Henderson equations. Preparation of acidic and basic buffers. Relative strength of acids and bases from Ka and Kb values. Neutralisation-titration curve, theory of indicators, choice of indicators. Use of phenolphthalein and methyl orange.

Complexometric titrations

Stability of complexes, titration involving EDTA. Metal ion indicators and characteristics. Problems based on titrimetric analysis.

Books for Reference:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
3. Soni P.L.,Mohan Katyal,Text book of Inorganic chemistry,20th edition,Sultan Chand & Son,New Delhi (1992)
4. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
5. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal Publishing Co., Jalandar, (2004)
6. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand &Son,New Delhi (2001)
7. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
8. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition,S. Chand & Company Ltd., New Delhi, (2008).
9. Morrison R.T., Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (2006).
10. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
11. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition,S. Chand & Coy Ltd.,New Delhi, (2006).
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son,New Delhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
14. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2008).
15. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Students should able to understand the standardized names and symbols to represent atoms, molecules, ions and apply on chemical reactions.
- Students should able to explain the behavior and interactions between matter and energy at both the atomic and molecular levels.
- Students should able to understand the chemistry of alkanes.
- Students should become familiar with safe-handling of chemical and simple first aid procedures for accidents involving acids.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
I	**17U1CHCP1**	**Volumetric Analysis practical**	**3**	**3**

A. Acidimetry and alkalimetry

1. Estimation of HCl by NaOH using a standard oxalic acid solution
2. Estimation of Na_2CO_3 by HCl using a standard Na_2CO_3 solution

B. Permanganometry

3. Estimation of oxalic acid by KmnO4 using a standard oxalic acid solution
4. Estimation of Iron (II) sulphate by KmnO4 using a standard Mohr's salt solution.

C. Dichrometry

6. Estimation of $KMnO_4$ by thio using a standard $K_2Cr_2O_7$ solution.
7. Estimation of Fe (III) by using $K_2Cr_2O_7$ using a standard Mohr's salt solution using internal and external indicators (not for examination).
8. Estimation of copper (II) sulphate by $K_2Cr_2O_7$ solution

D. Applied Experiments (not for examination)

9. Estimation of Total Hardness of water
10. Estimation of available Chlorine in Bleaching Powder
11. Estimation of chloride ion in neutral solution

Reference:

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)
2. Dr.Murugan,Former Head, Department of Chemistry , Micro scale Analysis procedure –Material (2012)

Course Outcome:

- Facilitate the learner to make solutions of various molar concentrations.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
I	**17U1CHMAA1**	**Allied Mathematics-I (For Physics and Chemistry)**	**5**	**3**

Objectives:

- To introduce the basic concepts of summation of series, theory of equations, special types of matrices, trigonometry and calculus.

UNIT-I

Algebra: Binomial Theorem: some standard expansions – general term – expansion of rationa fractions – approximations – summation of series - Exponential Theorem: results – summation of series - Logarithmetic series: standard results.

UNIT-II

Theory of Equations: Fundamental theorem of algebra – symmetric function of the roots – formation of equations – Diminishing of roots – Reciprocal Equations: four types.

UNIT-III

Matrices: Rank of a Matrix – elementary transformations - Linear Equations: Homogeneous and Non- Homogeneous equations – Characteristic Roots and Vectors – Properties of eigen vector – Cayley-Hamilton theorem.

UNIT-IV

Trigonometry: Expansion in series – expansion of $\cos^n\theta$ and $\sin^n\theta$ – expansion of $\cos n\theta$ and $\sin n\theta$ – expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ - Hyperbolic Functions – relations connecting hyperbolic functions and circular functions – periods of hyperbolic function – Inverse hyperbolic functions.

UNIT-V

Differential Calculus: Curvature – radius of curvature in Cartesians – parametric form - Maxima and minima of a function of two variables – Lagrange's method of undetermined multipliers.

Textbook:

Allied Mathematics, Paper-I, First Semester, P. Kandasamy and K. Thilagavathy, S.Chand & Company Pvt. Ltd., New Delhi, 2014.

Unit I : Algebra: Chapter II, III, IV
Unit II : Theory of Equations: Chapter I, II.
Unit III: Matrices: Chapter II, III, IV.
Unit IV: Trigonometry: Chapter I, II.
Unit V : Differential Calculus Chapter IV, V.

References:

1. *Algebra Volume I*, **T.K.M. Pillay, T. Natarajan and K.S.Ganapathy, S. Viswanathan (Printers & Publishers) Pvt. Ltd.**
2. ***Calculus Volume I***, S. Narayanan and T.K. Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2014.
3. *Trigonometry*, **Narayanan and T.K.Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2013.**

Course Outcome:

- To introduce the basic concepts of summation of series, theory of equations, special types of matrices, trigonometry and calculus

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
I	**17U1CHZOA1**	**ALLIED ZOOLOGY – 1**	**5**	**4**

Objectives:

1. To acquire a basic knowledge of animal diversity and organization.
2. To study the general aspects of Invertebrates and Parasites.
3. To study the general aspects of Chordata animals and their anatomy
4. To learn the general principles.

Unit I **Hrs 15**

1. Phylum Protozoa : Detailed study of Plasmodium - Protozoan Parasites of Man
2. Phylum Coelenterata: Obelia – External characters only.
3. Phylum Platyhelminthes: *Taenia solium* - Organisation and Life history.

Unit II **Hrs15**

1. Phylum Arthropoda: External characters of Prawn.
2. Phylum Mollusca: Fresh water Mussel – external characters only.
3. Phylum Echinodermata: Detailed study of Sea star.

Unit III **Hrs15**

General characters and outline classification of Chordata – Detailed study of Rat.

Unit IV **Hrs15**

Cell biology: Structure and functions of Eukaryotic cells,
Plasma membrane–Fluid Mosaic model, Mitochondria-Molecular structure, Kreb's cycle.
Genetics: Mendelian Principles – Monohybrid and Dihybrid.
Evolution: Lamarckism and Darwinism only.

Unit V **Hrs15**

Embryology: Types of vertebrate eggs and patterns of cleavage
Ecology: Food chain, Food web and Energy flow.

References

1. Ekambaranatha Iyer, M and Anatha Krishnan, T.N–Outlines of Zoology
2. Nair, N.C., Leelavathy, L. Soundara Pandian, N., Murugan, T and Arumugam, N. 2009.
   A Text book of Vertebrates. Saras Publications. Nagerkoil.
3. Rastogi, V.B. 1984. Invertebrate Zoology. Kedar Nath Ram Nath Publications, Meerut.
4. P.S.Verma and V.K.Agarwal(1996) – Cytology and Genetics.
5. P.S.Verma and V.K.Agarwal(1996) Animal Physiology and Ecology
6. Balinsky, B.J. (1981) An introduction to embryology, CBS College Publishing.
7. Arumugam. N. Evolution, Saras Publications, Nagerkoil.

Course Outcome:

- To acquire a basic knowledge of animal diversity and organization.
- To study the general aspects of Invertebrates and Parasites.
- To study the general aspects of Chordata animals and their anatomy
- To learn the general principles.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I & II	**17U2CHMAA2**	**Allied Mathematics-II (NS)**	**3+3**	-

Objectives:

- To introduce concepts of Hyperbolic function and correlation.
- To introduce the concepts of numerical solution of ordinary differential equation and 3 dimensional analytical geometry.

UNIT –I: Trigonometry

Expansions: Expansions of cos nθ and sin nθ – Expansions of tan nθ – Expansion of tan(A + B + C + …) – Powers of sines and cosines of θ – Expansions of $\cos^n\theta$ – Expansions of $\sin^n\theta$ – Expansions of sinθ and cosθin a series of power of θ .

UNIT – II

Hyperbolic functions: hyperbolic functions – Relation between hyperbolic functions – Relation between circular functions – Inverse hyperbolic functions – separation of real and imaginary parts of inverse hyperbolic function.

UNIT – III

Correlation – Karl Pearson coefficient of correlation – Rank correlation – Regression: Regression coefficients – Properties of regression coefficients

UNIT – IV

Numerical solution of ordinary differential equation: Taylor series – Euler's method – Modified Euler's method – R. K method - 4^{th} order only.

UNIT – V

Planes: Standard Equation of planes – angle between the planes – **Straight lines:** Equations of straight lines – coplanar lines – S.D between two skew lines – **Sphere:** equation of sphere – centre and radius – length of the tangent from the point to the sphere.

Text Book:

1. Trignometry, T.K.M.Pillai, S. Narayanan, 2015
   Unit I: Chapter – 3
   Unit II: Chapter – 4
2. Fundamentals of Mathematical Statistics, S.C. Gupta, V. K. Kapoor, Sulthan, 2002.
   Unit III: Chapter – 10(Sec.10.2–10.4, 10.7), Chapter – 11(Sec.11.1–11.2.2)
3. Numerical methods, P. Kandasamy, Thilagavathi and Gunavathi
   Unit IV : Chapter – 11(Sec.11.5, 11.9, 11.11 – 11.3)
4. Analytical Geometry 3D - T.K.M.Pillai, 2015
   Unit V: Chapter – 2(Sec.1-7), Chapter – 3(Sec.1-4, 7, 8), Chapter – 4(Sec.1-4)

General References:

1. Trigonometry - S.Arumugam
2. Statistics - M.Sivathanupillai
3. Ancillary Maths - P.R.,Vittal, Margam Publications.

Course Outcome:

- To introduce concepts of Hyperbolic function and correlation.
- To introduce the concepts of numerical solution of ordinary differential equation and 3 dimensional analytical geometry.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
I & II	**17U2CHZOAPL**	**Practical -I ALLIED ZOOLOGY (NS)**	**3+3**	**-**

Objectives:

1. To know the Digestive system, Nervous system of Earthworm and Cockroach.
2. To dissect and study the circulatory of Calotes.

Dissection

Earth worm-Nervous system.

Cockroach – Digestive and Nervous system.

Freshwater – Mussel – Digestive system.

Calotes - Arterial and Venous system.

Mounting:

Earthworm - Body setae and penial setae.

Freshwater mussel Pedal ganglion.

Cockroach and Honey bee - Mouth parts

Shark - Placoid scales

Spotters:

Paramecium, Trypanosoma, Sponge gemmules, Obelia colony, Obelia medusa, Ephyra larva, Physalia, Fasciola hepatica, T.S. of liver fluke, micracidium larva, Redia larva, Cercaria larva, Taenia solium entire, Scolex, Nereis entire, T.S. of Nereis, Parapodium, Leech entire, T.S of leech, Glochium larva, Starfish entire, Bipinnaria larva. Amphioxus entire, Shark, Salamander, Calotes, Pigeon and Rat.

A record of lab work should be maintained and submitted at the time of practical examination for valuation.

Reference

1. Ekambaranatha Iyer, M and Ananthakrishna, T.N. Outlines of Zoology.

Course Outcome:

- To know the Digestive system, Nervous system of Earthworm and Cockroach.
- To dissect and study the circulatory of Calotes.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
II	17U2____T2	**இடைக்கால இலக்கியம் – பயன்முறைத் தமிழ் –இலக்கண வரலாறு**	6	3

கூறு: I **நேரம்: 18**

1. திருஞானசம்பந்தர் - தேவாரம் - கோளறு திருப்பதிகம்
2. திருநாவுக்கரசர் -தேவாரம் -தனித்திருக் குறுந்தொகை - மாசில்வீணையும் - 1—10 பதிகம்
3. சுந்தரர் -தேவாரம் - திருநொடித்தான்மலைப் பதிகம் —தானெனை முன்படைத்தான்
4. மாணிக்கவாசகர் - திருவாசகம் - திருப்பொன்னூசல்

கூறு: 2 **நேரம்: 18**

1. குலசேகராழ்வார்: திருவித்துவக்கோட்டம்மான் : 1—10 பாடல்கள்
2. நம்மாழ்வார் - திருவாய் மொழி -இரண்டாம்பத்து —1—10 பாடல்கள்
3. ஆண்டாள் - நாச்சியார் திருமொழி —வாரணமாயிரம் 1—10 பாடல்கள்
4. திருமங்கையாழ்வார் - சிறிய திருமொழி —1—10 பாடல்கள்

கூறு: 3 **நேரம்: 18**

1. திருமூலர் - திருமந்திரம் - அட்டாங்க யோகம் —1—10 பாட்ல்கள்
2. குமரகுருபரர் - மீனாட்சியம்மை பிள்ளைத் தமிழ்: வருகைபருவம்
3. திரிகூடராசப்பக் கவிராயர் - குற்றாலக் குறவஞ்சி - நாட்டு வளம்
4. வீரமாமுனிவர் - திருக்காவலூர்க் கலம்பகம் — முதல் 5 பாடல்கள்
5. குணங்குடி மஸ்தான் சாகிபு - ஆனந்தக் களிப்பு —முழுதும்

கூறு: 4 பயன்முறைத் தமிழ் **நேரம்: 18**

வாக்கிய அமைப்பு - புணர்ச்சி வகைகள் - வலிமிகும், வலி மிகா இடங்கள் - எழுத்துப்பிழை நீக்கம் லகர, ளகர, ழகர வேறுபாடுகள் - சொற்களைப் பிரித்துப் பொருள் காணும் முறை - நிறுத்தற் குறியீடுகள் - சரியான தமிழ் வடிவம் அறிதல்.

சொல்லியல் - சொல் வகை - இலக்கண வகை - இலக்கிய வகை - பெயர்ச்சொல் - இடுகுறி - காரணம் - அறுபொருட் பெயர் (பொருள், இடம், காலம், சினை, குணம், தொழில்) - வினைச்சொல் - இடைச் சொல் - உரிச்சொல் - முற்று - எச்சம் - விகுதிகள் - இடைநிலை - தன்வினை - பிறவினை - தொிநிலை வினை - குறிப்பு வினை-வழுவமைதி.

கூறு: 5 இலக்கண வரலாறு **நேரம்: 18**

இலக்கண வரலாறு - தமிழ்த் துறை வெளியீடு.

பயன்கள்

இடைக்கால தமிழ் இலக்கியம் பற்றி தெரிந்து கொள்ளுதல்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**17U2 _ E2**	**PART – II EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To impart language and communicative skills through short stories, one act plays and communicative grammar

Unit – I

Shakespeare – The Seven Stages of Man
Long Fellow – A Psalm of Life
Nissim Ezakiel - Enterprise
William Wordsworth – The world is too much with us

Unit – II

Anton Chekov – The Proposal
J.B.Priestly - Mother's Day

Unit - III

William Faulkner - A Rose for Emily
P. Lankesh - Bread
Katherine Mansfield - The Doll's House

Unit – IV

Tense, Question Tag, Dialogue Writing, Paragraph Writing, Adjectives, Adverb

Unit – V

Voices, Degrees of Comparison, Direct and Indirect

Book Prescribed:

Unit I , II, III , Voices of vision in English (Vol. I & II), Board of Editors, Pavai Printers (P) Ltd., Chennai, 2016.
Unit IV & V – Communicative grammar by the Department of English, Poondi, 2017.

Course Outcome

To impart language and communicative skills through short stories, one act plays and communicative grammar

semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
II	**17U2CHC2**	**General Chemistry – II**	**6**	**5**

Unit - I

Chemical Bonding: Formation of ionic bond in NaF & $CaCl_2$. - lattice Energy – Born Haber Cycle - polarizing power and polarisability –formation of covalent bond in H_2 & Cl_2 - partial ionic character from electro negativity – transitions from ionic to covalent character and vice versa – Fajan's rule. Hydrogen bonding-inter and intra molecular hydrogen bonding – van der waals forces.

VB Theory - **MO theory** : Bonding and antibonding orbitals – application of MO theory to H_2,He_2,N_2,O_2,HF and CO – comparison of VB and MO Theories**. Hybridisation and VSEPR theory** :Shapes of molecules - $BeCl_2$, BF_3, NH_3 , H_2O ,PCl_5, SF_6,IF_7 and XeF_6.

Unit - II

Hydrogen: Position in the periodic table, atomic, nascent and occluded hydrogens - uses of hydrogen.

Elements of Group IA : General characteristics – diagonal relationship between Li and Mg – extraction and uses of Lithium - extraction, physical & chemical properties and uses of Sodium – preparation (Laboratory and Industrial methods) , properties and uses of NaOH and Na_2CO_3 .

Elements of Group II A: General characteristics – uses - diagonal relationship between Be and Al – Chemistry of $MgCO_3$ and $MgSO_4$.$7H_2O$– property and uses of Plaster of paris.

Noble gases: Position in the periodic table – isolation from atmosphere – general characteristics – uses.

Unit - III

Alkenes: Nomenclature – geometrical isomerism – E Z nomenclature –methods to distinguish geometrical isomers - general methods of preparation of alkenes – chemical properties – Markonikov's rule and peroxide effect - preparation and uses of polythene (using Ziegler – Natta Catalyst) , PVC. Polypropylene, Teflon.

Alkynes: Nomenclature - general methods of preparation – physical properties – Acidity of acetylene, addition of H_2, HX, X_2, ozonolysis, hydroboration and polymerisatin.

Alkadienes: Types - mechanisms of electrophilic and free radical addition reactions - thermodynamic and kinetic controlled reactions - natural rubber - chemistry of vulcanization -neoprene, and Buna S rubber.

Unit - IV

Aromatic Hydrocarbons: Structure of benzene - resonance in benzene – delocalized cloud in benzene and its consequences – aromaticity – Huckel's rule (4n+2) and its simple applications. **Aromatic electrophilic substitution**: Mechanisms of nitration, sulphonation, halogenations. Friedal Craft's alkylation and acylation in benzene – *Orientation in benezene* :activating and deactivating groups , ortho/para ratio – nuclear and side chain halogenations.

Polynuclear hydrocarbons : Isolation, properties, synthesis and uses of Naphthalene and Anthracene

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Unit - V

Real gases : van der Waals equation of states–derivation–significance of critical constants–Virial equations of state–law of corresponding states– compressibility factor. Inversion temperature and Joule Thomson effect. *Liquefaction of gases:* Linde , claud methods and demagneitisation methods

Molecular velocities: Maxwell's distribution (derivation not required) – mean, most probable and root mean square velocities – collision diameter, mean free path and collision number – **Transport properties** : Viscosity ,thermal conductivity and diffusion (concept only) – degrees of freedom - molecular basis of heat capacity

Books for Reference:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
3. Soni P.L.,Mohan Katyal,Text book of Inorganic chemistry,20th edition,Sultan Chand & Son,New Delhi (1992)
4. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
5. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal Publishing Co., Jalandar, (2004)
6. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand &Son,New Delhi (2001)
7. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
8. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition,S. Chand & Company Ltd., New Delhi, (2008).
9. Morrison R.T., Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (2006).
10. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
11. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition,S. Chand & Coy Ltd.,New Delhi, (2006).
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son,New Delhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
14. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2008).
15. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Students should able to learn about properties of ionic compounds lattice energy, Born-Haber cycle and its applications.
- Students should able to understand the synthetic methodology and chemical modifications of alkenes, dienes and alkynes.
- Students should understand the possible chemical modification of Aromatic compounds.
- Students should able to learn accepted models to describe the reactions between gaseous systems and become aware of their physical properties.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
II	**17U2CHCP2**	**Organic qualitative analysis and physical constants**	**3**	**3**

A. Organic qualitative analysis

Systematic analysis of an organic compound - Preliminary tests, detection of the element present, Aromatic or aliphatic, Saturated or unsaturated, nature of the functional group and exhibiting confirmatory tests and derivatives for the given organic compounds.

B. Physical constants:

Determination of physical constants (boiling point and melting point) of the given organic compound.

Reference:

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Course Outcome:

- Students learn the techniques of organic qualitative analysis.
- Students learn the determination of physical constants of organic compounds.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I & II	**17U2CHMAA2**	**Allied Mathematics-II (NS)**	**3+3**	4

Objectives:

- To introduce concepts of Hyperbolic function and correlation.
- To introduce the concepts of numerical solution of ordinary differential equation and 3 dimensional analytical geometry.

UNIT –I: Trigonometry

Expansions: Expansions of cos nθ and sin nθ – Expansions of tan nθ – Expansion of tan(A + B + C + …) – Powers of sines and cosines of θ – Expansions of $\cos^n\theta$ – Expansions of $\sin^n\theta$ – Expansions of sinθ and cosθin a series of power of θ .

UNIT – II

Hyperbolic functions: hyperbolic functions – Relation between hyperbolic functions – Relation between circular functions – Inverse hyperbolic functions – separation of real and imaginary parts of inverse hyperbolic function.

UNIT – III

Correlation – Karl Pearson coefficient of correlation – Rank correlation – Regression: Regression coefficients – Properties of regression coefficients

UNIT – IV

Numerical solution of ordinary differential equation: Taylor series – Euler's method – Modified Euler's method – R. K method - 4^{th} order only.

UNIT – V

Planes: Standard Equation of planes – angle between the planes – **Straight lines:** Equations of straight lines – coplanar lines – S.D between two skew lines – **Sphere:** equation of sphere – centre and radius – length of the tangent from the point to the sphere.

Text Book:

1. Trignometry, T.K.M.Pillai, S. Narayanan, 2015
   Unit I: Chapter – 3
   Unit II: Chapter – 4
2. Fundamentals of Mathematical Statistics, S.C. Gupta, V. K. Kapoor, Sulthan, 2002.
   Unit III: Chapter – 10(Sec.10.2–10.4, 10.7), Chapter – 11(Sec.11.1–11.2.2)
3. Numerical methods, P. Kandasamy, Thilagavathi and Gunavathi
   Unit IV : Chapter – 11(Sec.11.5, 11.9, 11.11 – 11.3)
4. Analytical Geometry 3D - T.K.M.Pillai, 2015
   Unit V: Chapter – 2(Sec.1-7), Chapter – 3(Sec.1-4, 7, 8), Chapter – 4(Sec.1-4)

General References:

1. Trigonometry - S.Arumugam
2. Statistics - M.Sivathanupillai
3. Ancillary Maths - P.R.,Vittal, Margam Publications.

Course Outcome:

- To introduce concepts of Hyperbolic function and correlation.
- To introduce the concepts of numerical solution of ordinary differential equation and 3 dimensional analytical geometry.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
I & II	**17U2CHZOAPL**	**Practical –I ALLIED ZOOLOGY (NS)**	**3+3**	**2**

Objectives:
1. To know the Digestive system, Nervous system of Earthworm and Cockroach.
2. To dissect and study the circulatory of Calotes.

Dissection

Earth worm-Nervous system.

Cockroach – Digestive and Nervous system.

Freshwater – Mussel – Digestive system.

Calotes - Arterial and Venous system.

Mounting:

Earthworm - Body setae and penial setae.

Freshwater mussel Pedal ganglion.

Cockroach and Honey bee - Mouth parts

Shark - Placoid scales

Spotters:

Paramecium, Trypanosoma, Sponge gemmules, Obelia colony, Obelia medusa, Ephyra larva, Physalia, Fasciola hepatica, T.S. of liver fluke, micracidium larva, Redia larva, Cercaria larva, Taenia solium entire, Scolex, Nereis entire, T.S. of Nereis, Parapodium, Leech entire, T.S of leech, Glochium larva, Starfish entire, Bipinnaria larva. Amphioxus entire, Shark, Salamander, Calotes, Pigeon and Rat.

A record of lab work should be maintained and submitted at the time of practical examination for valuation.

Reference

1. Ekambaranatha Iyer, M and Ananthakrishna, T.N. Outlines of Zoology.

Course Outcome:
- To acquire basic knowledge about the beneficial role of animals.
- To study the various types cultures.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
II	**17U2CHMAA3**	**Allied Mathematics- III (For Physics and Chemistry)**	**5**	**3**

Objectives:

- To study vector differentiation and vector integration with application.
- To study ordinary Differential equation and partial differential equation
- To study Fourier series and Laplace transforms.

Unit – I : Differential Equation:

Second order differential equation with constant coefficient of the types ay" + by' + cy = e^{ax}, g(x), x^n , sinax, & cosax only – solution of partial differentials of the form f(p, q) = o; f(z, p, q) = 0; f(x, p, q) = 0; f(y, p, q)= 0; f(x, p) = g(Y, q); z = p x + qy + f(p, q) - Lagrange's method for solving $P_p+Q_q=R$.

Unit – II: Laplace Transforms:

Definition – Laplace Transform of functions e^{at}, cosat, sinat and t^n - First Shifting theorem – Laplace transforms of e^{at}cos bt, e^{at} sin bt, e^{at} sinhbt, e^{at} coshbt, $e^{at}t^n$ - Transforms of f'(t) and f"(t) – Inverse transforms relating to the above standard forms - solution of ordinary differential equation with constant coefficients (involving the above transforms)

Unit –III Fourier Series:

Definition – finding Fourier coefficients for the given periodic function with period 2π - Even and odd functions – Properties - Half range series.

Unit – IV Vector differentiation:

Velocity and acceleration – scalar and vector fields – Divergence and curl-application – Laplalce operator.

Unit – V Vector integration:

Application of Gauss and Stoke's theorems (no proof of the theorem).

Text Book:

Unit I	:	Chapter 5 (Sec: 5.1 – 5.3)	Differential Equations – TKM Pillai
Unit II	:	Chapter 5	Calculus Volume III – TKM Pillai
Unit III	:	Chapter6 (Sec: 1 – 5)	Calculus Volume III – TKM Pillai
Unit IV	:	Chapter IV	Vector Algebra & Analysis – TKM Pillai
Unit V	:	Chapter VI	Vector Algebra & Analysis – TKM Pillai

General References:

1. Engineering Mathematics – A Singaravelu(Volume I & II)
2. Vector Calculus – K.Viswanbathan and S.Selvaraj.
3. Ancillary Mathematics – P.R.Vittal, Morgam Publications.

Course Outcome:

- To study vector differentiation and vector integration with application.
- To study ordinary Differential equation and partial differential equation
- To study Fourier series and Laplace transforms.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
II	**17U2CHZOA2**	**ALLIED ZOOLOGY – II**	**5**	**4**

Objectives:

1. To acquire basic knowledge about the beneficial role of animals.
2. To study the various types cultures.

Unit-I **Hrs15**

Vermiculture and composting – types of earthworm – rearing technology; Types of Vermicomposting: Small scale and Large scale method – economic importances.

Unit-II **Hrs15**

Sericulture –Types of silkworm; Biology and Life cycle of silkworm (*Bombyx mori*), Mori culture – economic importance of silkworm.

Unit- III **Hrs15**

Apiculture – Species of Honeybee – Types of bee hive – nutritive and medicinal value of honey and Bee wax.

Unit-IV **Hrs15**

Aquaculture – Scope of Aquculture – construction of a pond – Freshwater cultivable fishes – Water quality management -fish feed – Fish preservation - Economic importance of fishes.

Unit-V **Hrs15**

Poultry farming – Types of poultry – Poultry nutrition – diseases and their prevention – Economics of poultry production.

References

1. Agarwal, W.C. – Economic Zoology
2. Pradip V. Jabde – Applied Zoology.
3. T.V.R.Pillai, (1988) Aquaculure: Principles and practices. Fishing News Books.

Course Outcome:

- To acquire basic knowledge about the beneficial role of animals.
- To study the various types cultures.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
I & II	**17U2CHS1**	**Skill Based Elective -I Textile Processing**	**1**	**1**

Unit-I

Textile fiber and pretreatment: Classification of textile fibers – concept and techniques of Ginning, Sizing, Desizing, Scouring, Bleaching, and Mercerization - fiber identification tests (Flame test – microscopical & solubility test)

Dye chemistry: Colour and sensation - theories of colour and chemical constitution – Witt's theory - chromospheres - auxochrome – chromogen - classification of dye based on application.

Unit-II

Technical terms in dyeing: M.L.Ratio – % of shade – % of exhaustion – equilibrium absorption.

Dye bath assistants: Explanation and mechanism of exhausting agent, wetting agent, leveling agent, dispersing agent and carrier.

Fastness properties – Light, Washing Rubbings and sublimation fastness.

Textile proofing – Water proofs, moth proofing, mildew proofing & fire proofing.

Dyeing machineries: Padding mangle, Jigger, and Winch.

Non textile uses of dyes: Leather dyeing, paper dyeing, solvent dyes, food colours, hair colours and fluorescent brightening agents

References:

1. Venkataraman . K. The chemistry of synthetic dyes Vol, I, II, III & IV-, Academic Press, N.Y., 1949.
2. http://en.wikipedia.org/wiki/Hair_coloring.
3. http://www.pbm.com/~lindahl/articles/food_coloring_agents.html
4. http://en.wikipedia.org/wiki/Food_coloring
5. Shenai, V.A., Chemistry of Textile fibres, Vol.I, Sevak publication, Mumbai
6. Shenai, V.A., Chemistry of Dyes and Principles of dyeing, Vol.II, Sevak publication, Mumbai.

Course Outcome:

- Students should able to learn about the main purpose of dyeing.
- Students should able to understand about how fabrics are dyed in industry.
- Students should able to know about the dyeing is the application of dyes or pigments on textile materials.
- Students should able to know about dyes may require a mordant to improve the fastness of the dye on the fiber.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	17U3____T3	காப்பியங்கள், கட்டுரைகள், இலக்கிய வரலாறு	6	3

கூறு: I காப்பியங்கள் I **நேரம்: 18**

1. சிலப்பதிகாரம் - புகார்க் காண்டம்—மனையறம்படுத்த காதை
2. மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை
3. சீவக சிந்தாமணி - மண்மகள் இலம்பகம்
4. கம்பராமாயணம் - மிதிலைக் காட்சிப் படலம்

கூறு: 2 காப்பியங்கள் 2 **நேரம்: 18**

1. பெரிய புராணம் -மெய்ப்பொருள் நாயனார் புராணம் —முழுதும்
2. அரிசந்திரபுராணம் —மயான காண்டம்
3. தேம்பாவணி - திருமணப் படலம்—1—10 பாடல்கள்
4. சீறாப்புராணம் -நபி அவதாரப் படலம் —1—10 பாடல்கள்

கூறு: 3 கட்டுரைத் தொகுப்பு **நேரம்: 18**

கட்டுரைத் தொகுப்பு - தமிழ்த்துறை வெளியீடு

கூறு: 4 பொதுக்கட்டுரை, மொழிபெயர்ப்புப் பயிற்சி **நேரம்: 18**

பயிற்சிக் கட்டுரைகளும் கடிதங்களும் -பாவை வெளியீடு

கட்டுரைப் பயிற்சி - 10 மதிப்பெண்

மொழிபெயர்ப்புப் பயிற்சி - 5 மதிப்பெண்

கலைச்சொல்லாக்கம்

கூறு: 5 **நேரம்: 18**

அ. இலக்கிய வரலாறு

பக்தி இலக்கியங்கள் - காப்பிய இலக்கியங்கள் - சிற்றிலக்கியங்கள்

பயன்கள்

தமிழ் இலக்கிய வரலாற்றினையும் அதன் முக்கியத்துவத்தையும் தெரிந்து கொள்ளுதல்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3 _ E3**	**PART - II SHAKESPEARE, EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To introduce the language of the world renowned dramatist and novelist to enhance the vocabulary and communicative skills of the learners.

Unit – I

Funeral Oration – Julius Caesar

Trial for a Pound of Flesh – The Merchant of Venice

Unit – II

He Kills Sleep – Macbeth

The gulling scene of malvalio – Twelfth Night

Unit – III

Romeo and Juliet

In Love is a "Midsummer Madness" – Tempest

Unit – IV

R.L. Stevenson – Treasure Island

Unit – V

Note making, Hints Developing, Expansion of Ideas and Proverbs, Clauses and sentence, Structure simple, Compound and Complex.

Book Prescribed:

Unit – I, II & III: Selected scenes from Shakespeare, Prof.K.Natarajan, Pavai Printers (p) Ltd., 2017.

Unit IV: Treasure Island Abridged by E.F. Dodd

Unit V: Communicative Grammar by Department of English, Poondi, 2017.

Course Outcome

To introduce the language of the world renowned dramatist and novelist to enhance the vocabulary and communicative skills of the learners.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III	**17U3CHC3**	**General Chemistry – III**	**5**	**5**

Unit - I

Group III A: General characteristics of elements - diagonal relationship between B and Si - extraction, physical & chemical properties and uses of Aluminium – chemistry of Al_2O_3, – alloys of aluminum.

Group IVA: General characteristics of elements – anomalous behaviour of carbon and silicon from the rest of the family- allotropic forms of carbon – chemistry of charcoal – chemistry of CO & CO_2 – use of CO_2 in fire extinguishers – dry ice - preparation , properties and uses of silicon. **Group V A:** General characteristics of elements – unique features of nitrogen from the rest of the family – preparation of nitrogen – physical & chemical properties and uses of N_2.

Unit - II

Oxygen Family: Anomalous behaviour of oxygen – paramagnetic nature of oxygen - classification of oxides based on their chemical behaviour (acidic, amphoteric and neutral) and oxygen content (normal, per, super, di, sub and mixed oxides). Preparation properties and structure of peracids of sulphur.

Oxidation and Reduction Reactions: Definition(electronic theory) of oxidizing agents, reducing agents, equivalent weights of oxidizing and reducing agents - Oxidation number concept – Balancing redox equations by Oxidation number method and ion - electron method.

Halogen family: General characteristics of halogen with reference of electro negativity, electron affinity, oxidation states and oxidizing power - peculiarities of fluorine. *Inter halogen compounds:* Types – preparation and properties of $ICl.BrF_3$,ClF_5 and IF_7. *Pseudo halogens:* General characteristics – basic nature of iodine.

Unit - III

Organohalogen compound: Synthetic uses of Grignard reagents – **Aliphatic nucleophilic substitutions** : Mechanisms of SN^1, SN^2, and SN^i mechanisms– effect of leaving groups, nucleophiles and structure of substrate(Reactivity of methyl, ethyl, isopropyl, t-butyl, vinyl, allyl, benzyl halides). ***Elimination reaction***: mechanism of E_1 and E_2 reactions – elimination versus Substitution - Hoffmann and Saytzeff elimination. **Aromatic nucleophilic substitutions** *:* Benzyne mechanism and intermediate complex mechanism.

Unit - IV

Stereochemistry: projection formulae (Fisher, Sawhorse, Newmann)- stereoisomerism – types – optical isomerism - chirality – idea of asymmetry and dissymmetry - R,S notations of simple aliphatic compounds - D, L notations– erythro, thero conventions – optical activity – Optical isomerism exhibited by lactic and tartaric acid – resolution of racemic mixture – stereoselectivity (bromination of cyclo hexene) and stereospecificity (bromination of 2- butane) in organic reactions - Walden inversion. Optical activity of substituted allenes, spiranes and biphenyls.

Unit - V

Qualitative Inorganic Analysis: Dry test, flame test, Cobalt nitrate test - Wet confirmatory tests for acid radicals - Interfering acid radicals- Theory of Interference- Elimination of Interfering acid radicals. Solubility Product – common ion effect – principle and application in semimicro analysis - reactions involved in the confirmatory tests of sulphate, nitrate, carbonate, chloride, fluoride borate, phosphates anions and Pb^{+2}, Cu^{+2}, Cd^{+2}, Bi^{+2}, Fe^{+2}, Fe^{+3}, Al^{+3}, Cr^{+3}, Co^{+2}, Ba^{+2}, Ca^{+2} ,Sr^{+2}, Mn^{+2}, Ni^{+2},Zn^{+2}, Mg^{+2} cations.

Books for Reference:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
3. Soni P.L.,Mohan Katyal,Text book of Inorganic chemistry,20th edition,Sultan Chand & Son,New Delhi (1992)
4. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
5. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal Publishing Co., Jalandar, (2004)
6. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand &Son,New Delhi (2001)
7. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
8. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition,S. Chand & Company Ltd., New Delhi, (2008).
9. Morrison R.T., Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (2006).
10. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
11. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition,S. Chand & Coy Ltd.,New Delhi, (2006).
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son,New Delhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
14. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India), Pvt.ltd.,Hyderabad(2008).
15. Frank J. Welcher and Richard B. Hahn, Semi micro Qualitative Analysis, New Delhi, Affiliated East- west Press pvt.Ltd. (1969).
16. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997).
17. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Students should able to learn about basics and General characteristics of Group III - A, IV-A and V-A elements
- Students should able to learn about reducing and oxidizing properties of inorganic compounds
- Students should learn about the formation of hydrides, halides and oxides, nitrogen, oxygen, halogen group family elements.
- Students should able to aware of the fundamental aspects of Stereochemistry and its influence on chemical properties.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III	**17U3CHC4**	**AGRICULTURAL CHEMISTRY**	**3**	**3**

Unit - I

Soil Science : Physical properties of soil – structure, retention of water by solid, soil moisture content, soil air, soil temperature – chemical properties of soil – chemical composition – soil colloids and its properties – ion charge reaction – soil colloid as source of plant nutrients - Soil pH– buffer action – effect of soil reaction on nutrients – Acid soil, alkaline soil, saline soil- tolerance by plants.

Unit -II

Fertilizer : Definition – Classification – Nitrogenouos , phosphatic and potassium fertilizers – importance, examples with concerned nutrients – complex and mixed fertilizers – micro nutrients and their functions in plants – sources – Bio fertilizers

Unit - III

Manures: Difference between fertilizer and manures – bulky organic manures – handling and storage practice – compost methods – manuring – concentrated organic manures.

Unit - IV

Insecticides: Definition of pesticide – classification of - safety measures – Insecticides – definition – plant product – Inorganic pesticides - organic pesticides – mode of action of DDT, BHC, methoxy chloro, chlordane-Endosulfan organo phosphorous compounds.

Unit - V

Fungicides and Herbicides: Inorganic and organic fungicides and herbicides acaricides, rodenticide, attractants, repellents, fumigants. Act and laws of insects and insecticides.

References :

1. N.C.Brady, the Nature and properties of soils Eurasia publishing house, (p) Ltd. 9th Ed. (1984).
2. Biswas, T.D. and Mukeherjee S.K. Text book of soil science (1987).
3. A.J.Daji A Text book of soil science –Asia publishing house, Madras (1970).
4. Donahue, R.L.Miller, R.W.and shickluna, J.C. Soil – An introduction to soil and plant Growth – Prentice Hall of India (P) Ltd., New Delhi(1987).
5. Colling, G.H. Commercial Fertilizers – McGraw Hill Publishing Coo., New York(1955)
6. Tisdale, S.L.Nelson , W.L. and Beaton , J.D. Soil fertility and fertilizers. Macmillan publishing company, New York (1990).
7. Hesse, P.R..A text book of soil chemical analysis John Muray, New York (1971).
8. Jackon, M.L., soil chemical analysis. Prentic Hall of India, New Delhi (1958).
9. Buchell, K.H.. Chemical of pesticides – John wiley &Sons, NewYork (1983).
10. Mcinikov, N.N. Chemistry of pesticides Vol.36 of Residue Review-springer verlac, New York (1971).
11. Sree Ramula I, U.S. chemistry of Insecticides and Fungicides – Oxford and IBH publishing (1979).

Course Outcome:

- Students should able to learn about basic introduction of soil and properties of soil.
- Students should able to understand about role of fertilizer in function of plants.
- Students should learn about the manufacture of manure and handling the storage practice of compost methods.
- Students should become aware of the fundamental aspects of insecticides, fungicides and herbicides.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III & IV	**17U3CHCP3**	**Inorganic Qualitative Analysis (NS)**	**2+3**	

Semimicro inorganic qualitative analysis

Analysis of a mixture containing two cations and two anions of which one will be an interfering ion using semimicro methods and conventional scheme with hydrogen sulphide.

1. **Cations to be Studied:** lead, copper, bismuth, cadmium, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, calcium, strontium, magnesium and ammonium

2. **Anions to be studied:** Carbonate, Sulphide, Sulphate, nitrate, chloride, bromide, fluoride, borate, oxalate, and phosphate

Reference:

I. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons (1997)

Course Outcome:
Basic and advanced laboratory procedures used in inorganic synthesis including spectroscopic and analytical techniques.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
III	**17U3CHPHA1**	**Allied Physics –I**	**5**	**4**

Unit I – Gravitation

Newtons law of gravitation – determination "G"- Boys method – density of earth – gravitational potential and field intensity due to a solid sphere at a point inside the sphere – outside the sphere – Elasticity: Twisting couple on a cylinder – determination of coefficient of Rigidity modulus –Static Torsion method –Bending of beams – Bending moment –Uniform bending-experimental method for the determination of Young's modulus – I section of girders.

Unit – II Sound

Composition of two simple harmonic motions (1) along a straight line and (2) at right angles – Lissajous figures and applications – Acoustic of buildings – Reverberation – intensity measurement by hotwire microphone method.

Unit – III Thermal Physics

Low temperature Physics – Production of low temperature – liquefaction of gases – liquefaction of helium – adiabatic demagnetization (qualitative)only – super conductivity –.Newton's law of cooling –verification-specific heat capacity of a liquid by cooling – Bomb calorimeter – Conduction: Coefficient of thermal conductivity – good and bad conductors – Searle's method for good conductors – Lees disc method for bad conductors – Stefan's law of radiation – Solar constant – Angstroms pyroheliometer.

Unit – IV Optics

Interference – thin film – reflection air wedge – Diffraction – Fresnel's and Fraunhofer diffraction – Transmission grating – theory – Polarization – Elliptically and Circularly polarized light – Quarter wave plate – Half wave plate – Babinet compensator – Optical activity – Laurent's half shade polarimeter.

Unit – V Relativity

Frames of reference – Galilean transformation – inertial and non-inertial frames – Michelson-Morley experiment – negative result – postulates of special theory of relativity -Lorentz transformation equations – time dilation – length contraction – Wave mechanics – De Broglie's concept of matter waves – Davisson and Gemmer experiment- G.P. Thomson experiment – Uncertainty principle.

Books for study

1. Allied physics – A. Sundaravelusamy, Priya publications, Karur-2.
2. Allied physics - R. Sabesan and others, Popular Book Depot, Madras-15.

Course Outcome:

- To understand the basic properties of materials.
- To acquire the knowledge about acoustics.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
III & IV	**17U4CHPHAPL**	**Allied Physics Practical (NS)**	**3+3**	**-**

List of Experiments Any 14 Experiments

1. Young's modulus – non uniform bending.
2. Rigidity modulus –Static Torsion
3. Coefficient of viscosity – Graduated burette method.
4. Specific heat capacity of liquid – Newton's law of cooling
5. Newton's rings – Radius of curvature.
6. Air wedge – Thickness of wire
7. Spectrometer prism – A and D
8. Spectrometer grating – normal incidence
9. Field along the axis of the coil
10. Carey Fosters Bridge – specific resistance
11. P.O Box – Specific Resistance
12. Potentiometer – ammeter calibration
13. Figure of merit of a galvanometer – Half deflection method – B.G
14. Diode – characteristics
15. S.T and interfacial – drop weight method
16. Logic gates – using Discrete Components.

Course Outcome:
Students acquire skills in doing experiments related to properties of matter and sound.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
IV	17U4____T4	சங்க இலக்கியம் – அற இலக்கியம் – செம்மொழி – இலக்கிய வரலாறு	6	3

கூறு: I

நேரம்: 18

குறுந்தொகை

1. குறிஞ்சி - (பா.எ.:3) 2. முல்லை - (பா.எ.94)
3. மருதம் - (பா.எ.45) 4. நெய்தல் - (பா.எ.:49)
5. பாலை - (பா.எ.:41)

நற்றிணை

1. குறிஞ்சி - (பா.எ. 32) 2. முல்லை - (பா.எ. 81) 3. மருதம் - (பா.எ. 210)
4. நெய்தல் - (பா.எ. 226) 5. பாலை - (பா.எ.229)

கலித்தொகை

1. பாலை - (பா.எ. 6) 2. குறிஞ்சி - (பா.எ. 38)

அகநானூறு

1. குறிஞ்சி : - (பா.எ. 68) 2. மருதம் - (பா.எ. 86)

கூறு: 2

நேரம்: 18

ஐங்குறுநூறு

குறிஞ்சி - தோழிக்கு உரைத்த பத்து: பாடல் எண்கள் —111—120

புறநானூறு

பாடல் எண்கள் 8,17,20,95,141,159,184,186,188,206

பதிற்றுப்பத்து

ஏழாம் பத்து —பாடல் எண். 1

பரிபாடல்

எட்டாம் பாடல் : செவ்வேள்

கூறு: 3

நேரம்: 18

நெடுநல்வாடை முழுவதும்

திருக்குறள்: வான்சிறப்பு, பெருமை, காதற் சிறப்புரைத்தல்

கூறு: 4

நேரம்: 18

செம்மொழி வரலாறு

மொழி - விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச்செம்மொழி - தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

கூறு: 5

நேரம்: 18

அ. இலக்கிய வரலாறு

சங்க இலக்கியங்கள், பதினெண்கீழ்க்கணக்கு நூல்கள்

பயன்கள்

சங்க கால தமிழ் இலக்கியம் பற்றி தெரிந்து கொள்ளுதல்

Semester	Subject Code	Title of The Paper	Hours of Teaching/ Week	No. of Credits
IV	**17U4 _ E4**	**PART - II ENGLISH FOR COMPETITIVE EXAMINATIONS**	**6**	**3**

Objective

- To prepare the learners for competitive examinations and to know the fundamentals of practical communication.

Unit – I

Grammar – Number, Subject, Verb, Agreement, Articles, Sequence of Tenses, Common Errors.

Unit – II

Word Power - Idioms & Phrases, one word substitutes, Synonyms, Antonyms, Words we often confuse, foreign words & phrases, spelling.

Unit – III

Reading & Reasoning – Comprehension, Jumbled Sentences.

Unit - IV

Writing Skills – Paragraph, Precis Writing, Expansion of an idea, Report Writing, Essay, Letters, Reviews (Film & Book)

Unit – V

Speaking- Public speaking, Group Discussion, Interview, Spoken English.

Prescribed Text:

English for Competitive Examinations, by Ayothi, Trichy, 2017

Course Outcome

To prepare the learners for competitive examinations and to know the fundamentals of practical communication.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
IV	**17U4CHC5**	**General Chemistry – IV**	**6**	**5**

Unit - I

Metallurgy: Occurrence of metals – minerals & ores – mineral wealth of India. *concentration of ores*: Froth floatation, magnetic separation, liquation, leaching. *Production of the metal:* calcinations, roasting, smelting, aluminothermic process and amalgamation. *purification of metals* : Poling, electrolysis, zone refining , cupellations, Van Arkel and de Boer methods – Microbial metallurgy.

Chemistry of transition elements: Electronic configuration – general periodic trend – group study of iron, copper and zinc – galvanization.

Unit - II

Iron: Commercial forms - manufacture of cast iron. **Steel**: Classification and heat treatment -alloys of steel (composition and uses).

f-Block Elements: Electronic configuration**.** *Lanthanides and actinides*: Occurrence, oxidation states, magnetic properties, colour (not for actinides) and spectra – lanthanide and actinide contraction - differences between lanthanides and actinides - separation of lanthanides by ion exchange and solvent extraction methods – uses of lanthanides and actinides - extraction and properties of thorium.

Unit - III

Alcohols: Classification and nomenclature – General methods of preparation, physical & chemical properties aliphatic alcohols - industrial preparation of ethanol – preparation , properties and uses of glycerol.

Ethers: Classification and nomenclature: Preparation, physical & chemical properties of Diethyl ether and Anisole – estimation of methoxy group by zeisel's method.

Crown ethers: Introduction – structures – applications.

Unit - IV

Chemical Kinetics: Rate of a reaction, rate equation, order and molecularity of reaction. Factors influencing the reaction rate–zero, first, second and third order reactions and their characteristics- pseudo uni molecular reaction - derivation of rate constants for first and second order reactions (equal initial concentration) – derivation of time for half change with examples. Methods of determination of order of reactions - effect of temperature on reaction rate – concept of activation energy, energy barrier - Arrhenius equation. *Theories of reaction rates*: collision theory – absolute reaction rate theory (ARRT) for a bimolecular reaction.

UNIT - V

Catalysis: General characteristics of a catalyst .*Types*: Homogeneous and heterogeneous catalysis, positive and negative catalysts, acid – base, induced, auto and enzyme catalysis – promoter – catalytic poisoning (anti catalyst) - intermediate compound theory and adsorption theory catalysis. Factors increasing and decreasing the catalytic activity - mechanism and characteristics of enzyme catalysis – Michaelis-Menton equation.

Adsorption: Types – characteristics of adsorption - comparison of chemisorption and physisorption - *Isotherms*: Freundlich and Langmuir adsorption isotherms.

Colloids: Definition - types - stability - gold number - kinetic, optical and electrical properties. *Emulsion and Gels*: Types of emulsions, preparation, properties and application.

Books for Reference:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
3. Soni P.L.,Mohan Katyal,Text book of Inorganic chemistry,20th edition,Sultan Chand & Son,New Delhi (1992)
4. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
5. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal Publishing Co., Jalandar, (2004)
6. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand &Son,New Delhi (2001)
7. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
8. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition, S. Chand & Company Ltd., New Delhi, (2008).
9. Morrison R.T., Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (2006).
10. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
11. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition, S. Chand & Coy Ltd.,New Delhi, (2006).
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition, Sultan Chand & Son,New Delhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry, Vishal Publishing Co., Jalandar, (2012)
14. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2008).
15. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Students should able to learn about the chemical aspects of Metallurgy.
- Students should able to understand about the compounds of d block elements and f block elements.
- Students should able to understand about extraction of lanthanides and actinides.
- Students should able to know the chemical conversions and applications of alcohols and alkyl halides.
- Students should able to understand rate and mechanism of chemical reactions and theories of reaction rate and catalysis.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III & IV	**17U4CHCP3**	**Inorganic Qualitative Analysis (NS)**	**2+3**	**3**

Semimicro inorganic qualitative analysis

Analysis of a mixture containing two cations and two anions of which one will be an interfering ion using semimicro methods and conventional scheme with hydrogen sulphide.

1. **Cations to be Studied:** lead, copper, bismuth, cadmium, antimony, tin, iron, aluminium, zinc, manganese, cobalt, nickel, barium, calcium, strontium, magnesium and ammonium

2. **Anions to be studied:** Carbonate, Sulphide, Sulphate, nitrate, chloride, bromide, fluoride, borate, oxalate, and phosphate

Reference:

Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons (1997)

Course Outcome:
Basic and advanced laboratory procedures used in inorganic synthesis including spectroscopic and analytical techniques.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
II & IV	**17U4CHPHA2**	**Allied Physics –II**	**5**	**4**

Unit – I Magnetism

Poles and dipoles – Gauss's law for magnetism – Paramagnetism – Diamagnetism - Ferromagnetism. Electromagnetism: Biot-Savart's law – Magnetic field due to a straight conductor – circular conductor – field along the axis of a coil – solenoid – Ampere's theorem.

Unit – II Electricity

Kirchhoff's law and their applications – Kirchhoff's law – Whetstone's Bridge – Carey Foster's Bridge. Electromagnetic induction: Laws of electromagnetic induction – expression for induced e.m.f – self inductance of a solenoid – Rayleigh's method – Mutual inductance of solenoid – Determination of coefficient of coupling – Eddy currents and its applications.

Unit – III Atomic Physics

Vector atom model – quantum numbers in vector atom model – Pauli's exclusion principle – Periodic classification of elements – Photoelectric effect – Einstein's photo electric equation – experimental verification – Photomultiplier tube.

X – rays : continuous and characteristic X-rays – Mosley's law and its importance –Bragg's Law – Bragg 's spectrometer – crystal structure.

Unit – IV Nuclear Physics

Nuclear size – mass – charge – spin magnetic moment – packing fraction – stability and binding energy – Liquid drop model – shell model – nuclear fission – multiplication factor – critical size – chain reaction – nuclear fusion – stellar energy – Thermonuclear reaction – controlled thermonuclear reaction – nuclear reactor.

Unit – V Electronics

Necessity of modulation – Different types of modulation – junction Diode Detector – Ionosphere and propagation of radio waves – AND,OR,NOT,NOR,NAND GATES – Laws of Boolean algebra Demorgan's theorems – Universal building block.

Books for study

1. Allied physics – A. Sundaravelusamy, Priya publications, Karur-2.
2. Allied physics - R. Sabesan and others, Popular Book Depot, Madras-15.

Course Outcome:

To introduce the concepts of Dynamics, Friction.
To introduce the knowledge about Relativity.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
III & IV	**17U4CHPHAPL**	**Allied Physics Practical (NS)**	**3**	**2**

List of Experiments Any 14 Experiments

1. Young's modulus – non uniform bending.
2. Rigidity modulus –Static Torsion
3. Coefficient of viscosity – Graduated burette method.
4. Specific heat capacity of liquid – Newton's law of cooling
5. Newton's rings – Radius of curvature.
6. Air wedge – Thickness of wire
7. Spectrometer prism – A and D
8. Spectrometer grating – normal incidence
9. Field along the axis of the coil
10. Carey Fosters Bridge – specific resistance
11. P.O Box – Specific Resistance
12. Potentiometer – ammeter calibration
13. Figure of merit of a galvanometer – Half deflection method – B.G
14. Diode – characteristics
15. S.T and interfacial – drop weight method
16. Logic gates – using Discrete Components.

Course Outcome:
Students acquire skills in doing experiments related to properties of matter and sound.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
IV	**14U4CHS2**	**Skill Base Elective - II Practical on Textile Processing**	**1**	**1**

I Pretreatment & Dyeing of cotton fabrics

Desizing

Scouring

Bleaching

Dyeing

II Combination and percentage of shade

0.5 shade

1 % shade

2 % shade

2 % Combination shade

III Fibre identification tests: For Cotton, Wool, Jute, Viscose, Silk and Polyester

IV Preparation of Dye: Methyl orange and phenol red

References:

1. Chemistry of Dyes and principles of dyeing by Dr. V.A. Shenai.
2. Technology of textile fibre, V.A. Shenai.

Course Outcome:

- Students should able to learn about the chemical aspects of Metallurgy.
- Students should able to understand about the compounds of d block elements and f block elements.
- Students should able to understand about extraction of lanthanides and actinides.
- Students should able to know the chemical conversions and applications of alcohols and alkyl halides.
- Students should able to understand rate and mechanism of chemical reactions and theories of reaction rate and catalysis.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHC6**	**Organic Chemistry – I**	**5**	**6**

UNIT - I

Carbonyl Compounds: Introduction – nomenclature of carbonyl compounds. - reactivity of carbonyl group – activity of alpha hydrogen - mechanisms of Aldol, Perkin, Knoevenagel, Benzoin condensations and Claisen , Reformatsky, Witting, Cannizaro, haloform reactions - reduction mechanisms of sodium borohydride, lithium aluminum hydride - WolfKishner, Clemmenson and MPV reductions - Oppenauer oxidation - Michael addition reaction.

UNIT - II

Mono carboxylic acids: Nomenclature – acidity – influence of substituents on acidity (aliphatic and aromatic acids) – ortho effect – reactions. *Dicarboxylic acids* :Nomenclature, - acidity - preparation and properties of oxalic, malonic, succinic, glutaric and adipic acids. *Characteristics of reactive methylene group***:** Synthetic uses of malonic and acetoacetic esters. **Tautomerism:** definition – Keto – Enol tautomerism (identification, acid and base catalysed mechanisms)
Esters : Nomenclature – general methods of preparation- chemical properties and uses.

UNIT - III

Nitrogen compounds: Nomenclature - nitro alkanes - alkyl nitrites - differences – nitro aci nitro tautomerism. *Aromatic nitro compounds*: Reduction of nitro benzene under different conditions. *Amines* :Gabrial phthalimide synthesis, Hoffmann degradation-separation of mixture of amines by Hoffmann method and Hinsberg method - effect of substituent's on basicity and comparison of aliphatic and aromatic amines - mechanism of carbylamines reaction and diazotization. *Diazomethane, benzene diazonium chloride and diazo acetic ester*: Preparation and synthetic importance.

UNIT - IV

Heterocyclic compounds: Nomenclature. *Furan, pyrrole, thiophene* : preparation and properties. *Pyridine* : synthesis and reactions - comparison of the basicities of pyrrole, pyridine and piperidine with amines.*quinoline, isoquinoline and indole* : Synthesis with special reference to Skraup, Fischer Napieraloki and Ficher - indole syntheses and properties

UNIT - V

Dyes: Theory of colour - chromophore, auxochrome, classification according to application and structure - preparation and uses of Malachite green, Indigo, Alizarin dyes.

Benzenesulphonic acid - saccharin, chloramines– T, sulphonamides, sulphanilic acid Sulphanilamide: Preparation, properties and uses.
Polymers: Definition – classification of polymers-mechanism of cationic, anionic and free radical polymerization –thermo setting polymers – preparation of Nylon 66, polyester, bakelite.

Oils and fats - fatty acids – Introduction- manufacture of soap - mechanism of cleaning action of soap-detergents-merits and demerits of soap and detergent.

Books for Reference:

1. Finar I.L, Organic Chemistry, Vol 1&2, (6th edition) England, Addison Wesley. Longman Ltd. (1996)
2. Morrison R.T., Boyd R.N., Organic Chemistry, (6th edition) New York, Allyn & Bacon Ltd., (2006)
3. Bahl B.S, Arun Bahl, Advanced Organic Chemistry, (12th edition) New Delhi, Sultan Ch and Co., (1997).
4. Pines S.H., Organic Chemistry, (4th edition) New Delhi, Mc Graw - Hill International Book company (1986)
5. Seyhan N. Ege., Organic Chemistry, New York, Houthton Mifflin Co., (2004)
6. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son, New Delhi (2007)
7. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
8. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2008).
9. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition,S. Chand & Coy Ltd., NewDelhi,(2006).
10. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Student should able to learn about the comprehensive knowledge and understanding the reactions of carbonyl compounds and organic nitrogen compounds
- Student should able to learn about the synthesis and reactions of Oxygen,Nitrogen and sulphur based heterocyclic compound.
- Student should able to learn about the fundamentals of colours, dyes, polymers, soaps and detergents.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHC7**	**Physical Chemistry – I**	**5**	**6**

UNIT - I

Thermodynamics: Definitions of System, surrounding, isolated, closed and open systems, state of the system, Intensive and extensive variables. *Thermodynamic processes*: Reversible and irreversible, isothermal and adiabatic processes - state and path functions - exact and inexact differentials.

First law of thermodynamics: Statement - definition of internal energy (E), enthalpy (H) and heat capacity. Relation between Cp and Cv. calculation of w, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic conditions of reversible and irreversible processes. Definition of joule - thomson coefficient ($\mu_{J.T}$) - calculation of ($\mu_{J.T}$) for ideal and real gases .

Thermochemistry: Relation between enthalpy of reaction at constant volume (q_v) and at constant pressure (q_p) - temperature dependence of heat of reaction - Kirchoffs equation - bond energy and its calculation from thermochemical data - Hess's law of heat summation (statement and applications)

UNIT - II

Second law of thermo dynamics : Need for the law - different statements of the law - Carnot's cycle and efficiency of heat engine - Carnot's theorem - thermodynamic scale of temperature.

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 .

Gibb's free energy (G) and Helmholtz 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 ΔG as criteria for spontaneity and equilibrium - advantage of ΔG over entropy change.

UNIT - III

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

Equilibrium constant and free energy change: Thermodynamic derivation of law of mass action - equilibrium constants in terms of pressure and concentration - thermodynamic interpretation of Lechatelier's principle - Van't Hoff's reaction isotherm - Van't Hoff's isochore - Clapeyron equation and Clausius – Clapeyron equation- applications

Systems variable composition : Partial molar quantities - chemical potential - variation of chemical potential with T, P and X (mole fraction) - Gibb's Duhem equation.

UNIT - IV

Solutions: Henry's law and Raoult's law - Ideal and non-ideal soultions, concept of activity and activity coefficients – Gibbs - Duhem - Margules equation .*Completely miscible liquid systems :* benzene and toluene - deviation from Raoult's law. Theory of fractional distillation **-** azeotropes - HCl - water and ethanol - water systems . *Partially miscible liquid systems* : phenol - water, triethylamine - water and nicotine - water systems. lower and upper CSTs - effect of impunities on CST. *Completely immiscible*

liquids : Principle and applications of steam distillation - Nernst distribution law – derivation - applications.

Dilute solutions: Colligative properties, lowering of vapour pressure, elevation of boiling point , depression of freezing point , osmotic pressure - determination of molecular masses using the above properties - abnormal molecular masses – (molecular dissociation & association).

UNIT – V

Phase rule: Definition of terms - derivation .*One component systems*: water and sulphur - super cooling - sublimation. *Two component systems*: solid liquid equilibria. *Simple eutectic systems***:** (lead-silver, Bi-Cd) - desilverisation of lead - compound formation with congruent melting point. (Mg-Zn) and incongruent melting point (Na-K).

Solid solutions: (Ag-Au) - fractional crystallisation.- *Freezing mixtures* : $FeCl_3$ - H_2O systems and $CuSO_4$-H_2O system.

Book for Reference:

1. Puri B.R., Sharma L.R., Pathania M.S., Principles Of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal, Nagin Chand & Co., (1993)
2. Maron and Prutton, Physical Chemistry, Mac Millan, London.
3. Atkins P.W., Physical Chemistry, (5th edition) Oxford Uiversity Press. (1994)
4. Castellan G.V., Physical Chemistry, Orient Longmans, New Delhi.
5. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand & Son,New Delhi (2001)
6. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
7. Arun Bahl, Bahl .B.S., Tuli G.D., Essentials of Physical , Multi colour edition, S. Chand & Company Ltd., New Delhi, (2008).

Course Outcome:

- Students should able to learn about chemical and physical states of various systems and their coexistence in equilibrium.
- Students should able to understand the efficient way of converting work in to energy and vice versa from the thermodynamics perspective.
- Students should identify the chemical aspects of metallic mixtures composition and properties through phase diagrams.
- Students should able to learn about solutions, their types, colligative properties, effect of added salt and molecular weight determination.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5CHC8**	**Inorganic Chemistry**	**5**	**6**

UNIT - I

Coordination compounds: Central metal ion – ligands-types of ligands– coordination number, oxidation numbers, and coordination sphere – Nomenclature - isomerism (structural and stereo) - Werner's theory of complexes. EAN rule VB theory- applications and limitations, Factors affecting stability of complexes.

UNIT - II

Crystal Field theory: Crystal field splitting in octahedral, tetrahedral and square planar fields – factors influencing the magnitude of crystal field splitting – magnetic properties and colour. Labile and inert complexes- stepwise and overall stability constants- Reaction mechanism – substitution reactions in octahedral complexes – Acid hydrolysis: SN1 and SN2 mechanisms – Complementary and non- complementary reactions- Trans effect.

UNIT - III

Biologically important coordination compounds: Structure and application Chlorophyll, hemoglobin, vitamin B_{12} – role of alkali and alkaline earth metals in biological systems.
Metal carbonyls - synthesis and structure of mono nuclear carbonyls of Ni, Fe, Cr, and bi nuclear carbonyls of Co , Mn - synthesis and structure . **Nitrosyl compounds**: Classification, preparation and properties - structure and uses of sodium nitroprusside.
Biological functions and toxicity of some elements : Cr, Mn, Co, Ni, Cu, Se, Mo, Cd, I, Hg Pb, Fe and Zn. Estimation of nickel using DMG and aluminium using oxine - estimation of hardness of water using EDTA.

UNIT - IV

Solid state : Isotropic and anisotropic solids – Interfacial angle – symmetry elements in crystal systems – Bravais lattices - Unit cell – law of rational indices (Weiss indices), Miller indices – unit cell dimension – density – number of atoms per unit cell – X-ray diffraction by crystals – derivation of Bragg's equation – Experimental methods of X-ray study- rotating crystal method – X-ray pattern by powder method – crystal structure of KCl, NaCl, ZnS, CsCl – Radius ratio and packing in crystal. 3

UNIT – V

Organo metallic compounds : Introduction - *Ferrocene*: preparation , property, structure and stability – *Zeigler natta catalyst. Binary compounds* : hydrides ,borides (structure, properties and uses), Boranes (structure of Diborane only) carbides (classification and applications only) and Boron nitride and Borozole (structure only) – Clathrates (examples , applications, formation in quinol). *Silicones*: composition, manufacture, structure, properties and uses. **Silicates**: Different types with examples and structures.

Books for Reference:

1. Soni P.L., Text Book of Inorganic Chemistry, S, Chand & Co, New Delhi (2006).
2. Madan R.D.,Juli G.D and Malik S.M.,Selected Topics in Inorganic Chemistry, S.Chand & Co,NewDelhi (2006) 4.Lee J.D.,Concise Inorganic Chemistry, ELBS Edition.
3. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)

4. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
5. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).

Course Outcome:

- Students should able to learn about the concept of coordination compounds, their structural and theories of coordination compounds
- Students should able to understand the bioactivity of proteins, enzymes, metals, vitamins, hemoglobin and myoglobin.
- Students should able to learn about solids, their properties, close packing in crystals, and use of X-rays in crystal structure determination.
- Students should able to understand about the organo metallic compounds, binary compounds, clathrates and structure of silicates.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5CHCP4**	**Physical Chemistry practical**	**3**	**4**

1. Determination of Partition coefficient of iodine between Carbon tetrachloride
2. Determination of rate constant of acid catalyzed hydrolysis of an ester (Methyl acetate or ethyl acetate).
3. Determination of molecular weight by Rast's method using naphthalene, di phenyl, m- di nitro benzene as solvents and benzamide, naphthalene, acetanilide, di phenyl as solutes.;
4. Determination of CST of Phenol
5. Effect of impurity on CST of Phenol
6. Determination of transition temperature of crystal hydrates such as sodium thio sulphate, sodium acetate, strontium chloride, manganese chloride.
7. Phase diagram of Naphthalene – Di phenyl amine system, Naphthalene – Di phenyl , Naphthalene – m –di nitro benzene, Naphthalene – p- nitro toluene.
8. Determination of strength of NaOH solution by Conductometric titrations using standard HCl acid.
9. Determination of strength of KMnO4 solution by Potentiometric titrations using standard FAS solution.
10. Determination of cell constant

Reference:

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Course Outcome:
To understand and describe atoms and molecules.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHEL1A**	**Major elective - I PHARMACEUTICAL CHEMISTRY**	**4**	**4**

Unit - I

Terminology: Drugs, pharmacy, pharmacology, pharmacognosy toxicology, chemotherapy, Medicinally important compound – Aluminum Alum, Aluminium hydroxide gel –phosphorus – Phosphoric acid, Hypophosphorus acid – Iron – Ferrous gluconate – Ferrous sulphate –Preparation, Properties and uses.

Unit - II

Analgesic and Antipyretics: Types - Norcotic analgesics – Morphine, Heroin, Pethidine – Structure and uses. Non – narcotic analgesics – Aspirin, Methyl Salicylate, Paracetmol, Phenacticin – Preparation, Properties and uses.

Unit – III

Antibiotics: Introduction penicillin – Types, Structure, Properties, assay, SAR chloramphenicol, structure, Properties, SAR.

Unit - IV

Blood – Composition of blood, Function of erythrocytes leucocytes, platelets and plasma protein, blood grouping and matching, Hematological agents – Coagulation and blood coagulants.

UNIT V:

Clinical Chemistry

Determination of sugar (glucose) in serum – *o*-toluidine method – diagnostic test for sugar in urine – Benedict's test – detection of diabetes – detection of cholesterol in urine – detection of anaemia – estimation of haemoglobin (Hb concentration) – red cell count.

REFERENCES

1. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry; 5th Ed., S.Chand and Company Ltd., New Delhi, 2014.
2. S. Lakshmi; Pharmaceutical Chemistry; 1st Ed., S. Chand and Company Ltd., New Delhi, 1995.
3. Bhagavathi Sundari; Applied Chemistry; 1st Ed., MJP Publishers, Chennai, 2006.

Course Outcome:

- Student should able to learn about the terminology and important drugs and the mode of actions.
- Student should understand about the application of disinfectants and antiseptics.
- Student should identify the function of analgesic and antipyretics.
- Student able to aware about the antibiotics.
- Student get to know the estimation of sugar and hemoglobin.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
V	**17U5CHEL1B**	**Major Elective - I POLYMER CHEMISTRY**	**4**	**4**

UNIT – I

Physical Properties and applications Polymers: Mechanical – Strees – strain measurements Electrical – conducting – polyacetylene, polyaniline. Industrially important polymers – Natural and synthetic rubber– polyesters, polytetra fluoroethylene, (TEFLON), Polystyrene - ion exchange resins, polyacrylonitrile – carbon fibres, polyvinyl chloride and polyacrylates

UNIT – II

Synthesis and Kinetics: Kinetics of polymerization – free radical chain polymerization, cationic polymerization, anionic polymerization, copolymerization, Degree of polymerization, chain length, chain transfer, chain termination, stereo regular polymerization, zeigler Nata catalysts.

UNIT – III

Characterization: Crystalline Nature – X-ray diffraction, study of polymers, degree of crystallinity, Differential scanning Calorimetry, Thermogravimetric analysis of polymers. Glass Transition Temperature – factors affecting Glass Transition Temperature, properties associated with Glass Transition Temperature, Crystallinity and Melting point – Relations to structure.

UNIT – IV

Chemical Reaction Cyclikzation: Hydrolysis, Acidolysis, Hydrogenation, Addition and substitution reaction cross linking – Vulcanization, graft and Block Copolymers. Type of degradation – Thermal Mechanical, Oxidatived, Hydrolytic and photo degradation.

UNIT – V

Classification and Molecular weight Determination: Basic concepts of polymer science – molecular forces and chemical bonding in polymers – classification of polymer – addition polymers, condensation. Major mass and size of polymers – Number average and weight average molecular weight – methods of molecular weight determination. Osmometry viscosity, light scattering, sedimentation, Ulteracentrifuge; Molecular weight distribution curve.

References:

1. V.R. Gopwrikar – polymer science, wiley Eastern, 1986
2. K.J. Saunders, Organic Polymer Chemistry – Chapman and Hall, 1976
3. Raymound, B. Seymour, Polymer Chemistry – An introduction, Marcel Dekker Inc. NY 1981
4. Fred W. Billmeyer – Text book of polymer science, john – wiley.
5. K. Gupta, fundamentals of polymer science and Engineering, Tata, MgGraw Hill.
6. Stepak, polymer characterization of processing technology, Academic press, Indian.

Course Outcome:

- Student should understand about the Polymers preparation, uses and their applications.
- Student should learn about the Synthesis and Kinetics of polymerizations
- Student should understand about the Characterization of polymers.
- Student should identify about the Chemical Reaction Cyclization.
- Student should understand about the Classification and molecular weight determination.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5CHEL2A**	**Major Elective - II ANALYTICAL CHEMISTRY**	**5**	**3**

UNIT - I

Laboratory Hygiene and safety: Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous chemicals - simple first aid procedures for accidents involving acids, alkalies, bromine, burns and cut by glass - threshold vapour concentration and safe limits.

Estimations of commercial samples: Determination of percentage purity in Pyrolusite, Iron ore, washing soda and Bleaching power - estimation of glucose and phenol.

UNIT - II

Chromatography: Adsorption and partition principle - *Column chromatography*: Preparation of the column, elution, recovery of substances and applications. *Thin layer chromatography*: Choice of adsorbent - experimental methods - R_f-values and factors affecting the R_f values – applications of TLC. *Paper chromatography*: Principle, development of chromatogram, ascending, descending and radial techniques – superiority of TLC over paper chromatography – *Gas chromatography*: Principles and technique. *Ion - exchange chromatography*: Principle - requirements of a good resin - experimental techniques - *High Pressure Liquid Chromatography (HPLC)*: Principles and advantages.

UNIT - III

Thermo analytical methods: Principles of TGA, DTA and DSC - Characteristics of TGA ($CaC_2O_4.H_2O$, $CuSO_4.5H_2O$) and DTA ($CaC_2O_4.H_2O$) curves - factors affecting TGA and DTA curves - applications of TGA and DTA.

Electro analytical techniques: Theory of electro gravimetric analysis - determination of copper (by constant current procedure). *Electrolytic separation of metals*: Principle - separation of copper and nickel,

Coulometry: principle - Coulometry at controlled potential - apparatus and technique - separation of nickel and cobalt.

UNIT - IV

Colorimetry and spectrophotometry: principle of colorimetric analysis - colorimetric estimation of Ni^{+2} and Fe^{+3} - spectrophotometric determination of chromium.

Separation Purification techniques: principle involved in separation by precipitation and Solvent extraction - principles of crystallization, fractional crystallization - Principles and techniques of sublimation and solvent extraction (soxhlet extraction), simple, fractional and steam distillation, distillation under reduced pressure - *Desicants.*

UNIT – V

Gravimetric analysis: Principle - theories of precipitation - solubility product and precipitation – conditions of precipitations - specific and selective precipitants, organic and inorganic precipitants - purity of precipitates – co precipitation & post precipitation - precipitation from homogeneous solution - use of sequestering agents
Error analysis: Types of errors-minimizing errors - significant figures - accuracy - methods of expressing accuracy - precision - methods of expressing precision - mean, median, mean deviation, standard deviation and confidence limits – Q test.

Book for Reference:

1. Douglas A. Skoog and Donald M. West, F.J. Holler, Fundamentals of Analytical Chemistry, 7th edition, Harcourt College Publishers.
2. Mendham J., Denney R.C., Barnes J.D., Thomas M., Vogel's Text book of Quantitative Chemical analysis, 6^{th} edition ,Pearson education.
3. Sharma, B.K., Instrumental Methods of Chemical Analysis, Koyel Publishing House, Merrut, (1997)
4. Gopalan. R., Subramaniam P.S. and Rengarajan K., Elements of Analytical Chemistry, Sultan Chand and Sons, NewDelhi(2000).
5. Usharani S., Analytical Chemistry, Macmillian India Ltd., NewDelhi(2000)

Course Outcome:

- Students should able to understand about the competence in collecting and interpreting data from their knowledge on analytical techniques.
- Students should able to learn about the techniques of gravimetric analysis.
- Students should able to understand about the thermo gravimetric analysis, differential thermal analysis and its applications.
- Students should understand about chromatographic techniques such as TLC, GLC, HPLC and their applications industries, research fields and in day to day life.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHEL2B**	**Major elective - II BIOCHEMISTRY**	**5**	**3**

Objectives :

1. To enable the student to develop a sound knowledge of fundamental concepts in biochemistry.
2. To enumerate the molecular motif of a living cell, structural and functional hierarchy of biomolecules.
3. To emphasis on the various aspects of metabolism and interrelationship of metabolic events.

UNIT 1: **Amino acids and Proteins**

Living Cell – Plant and Animal cell. Cell membrane – organelles – functions of major subcellular components – Anabolism and catabolism and their relation to metabolism. **Amino acids** – classification –Synthesis of _-amino acids and their identification. Peptide bond- stereochemistry, synthesis of peptides by solution and solid phase techniques. **Proteins** – classification – properties-3D structure-determination of amino acid sequence – denaturation and renaturation of protein molecules. Separation and purification of proteins – dialysis – gel filtration - electrophoresis. Catabolism of amino acids: Transamination, oxidative deamination, decarboxylation. The urea cycle and other possibilities of detoxification of ammonia.

UNIT 2 : Enzymes

Nomenclature, classification and properties-specificity, factors influencing enzyme action. Mechanism of enzyme action – Lock and Key model and induced fit models. Coenzymes – cofactors – prosthetic groups of enzymes (TPP, NAD, NADP, FAD, ATP). Their importance in enzyme action. Mechanism of inhibition (competitive, non- and uncompetitive and allosteric). Immobilization of enzymes. Enzyme specificity,

UNIT 3: Lipids

Classification – Natural lipids, Phospho lipids (lecithines, cephalins, plasmalogens) and glycolipids – importance, synthesis and degradation. Fatty acids – saturated, unsaturated fatty acids, EFA. Properties – Hydrolysis-acid number, saponification number. Auto-oxidation (Rancidity), addition reactions-Iodine value, Polenske number, Reichert-Meissl number, acetyl number. Hydrogenation Cholesterol – biosynthesis. Bile salts derived from cholesterol. Metabolism: Oxidation of glycerol – _-oxidation of fatty acids; biosynthesis of lipids – synthesis of fatty acids and synthesis of triglycerides.

UNIT 4: Carbohydrates

Classification – reducing and non-reducing sugars. Glucose: structure-conformation – stability Carbohydrates of the cell membrane – starch, cellulose and glycogen. (Structure and utility) Metabolism: Glycolysis and its reversal; TCA cycle. Relation between glycolysis and respiration. Principles of bioenergetics, electron transport chain and oxidative phosphorylation.

Unit 5 Nucleic Acids

Nucleosides and nucleotides – purine and pyrimidine bases. Nucleic acids Difference between DNA and RNA. Classification of RNA. Biosynthesis of DNA: Replication. Biosynthesis of mRNA: Transcription. Genetic code – mutations and mutants. DNA repair. Biosynthesis of proteins. DNA sequencing and PCR, recombinant DNA technology, DNA polymorphism.

Text books

1. Lehninger, Principles of Biochemistry, Fourth Edition, by David L. Nelson and Michael M. Cox, Worth Publishers, New York, 2005.
2. L. Veerakumari, Biochemistry, MJP publishers, Chennai, 2004.
3. Lubert Stryer, Biochemistry, W. H. Freeman and company, New York, 1975.

Reference books

4. Robert L.Caret, Katherine J. Denniston, Joseph J. Topping, Principles and Applications of organic and biological chemistry, WBB publishers, USA, 1993.
5. J. L. Jain, Biochemistry, Sultan Chand and Co.1999
6. A. Mazur and B. Harrow, Text book of biochemistry, 10th Edition, W.B. Saunders Co., Philadelphia, 1971.
7. Paula Yurkanis Bruice, Organic chemistry, 3rd Edition, Pearson Education, Inc. (Singapore), New Delhi, reprint, 2002.
8. P. W. Kuchel and G. B. Ralston, Shaum Series, Theory and Problems of Biochemistry, McGraw-Hill Book Company, New York, 1988.

Course Outcome:

- Student should able to develop a sound knowledge of fundamental concepts in biochemistry.
- Student should able to enumerate the molecular motif of a living cell, structural and functional hierarchy of biomolecules.
- Student should able to emphasis on the various aspects of metabolism and interrelationship of metabolic events.

Semester	Subject code	Title of the paper	Hours of Teaching /Week	No. of Credits
V	**17U5CHNME**	**NON-MAJOR ELECTIVE Chemical aspects in Agriculture**	**1**	**1**

Unit I

Soil : Mechanical Components Constitution, Profile, Types – Functions of sand ,silt and Clay – Textural grouping of Soil – Soil Water : Hygroscopic, Capillary and Gravitational water – Soil Humus – Soil pH, Acidity and alkalinity –Formation of Acid Soil and its reclamation, formation of Alkaline soil, Saline soil ,Saline soil and its reclamation.

Fertilizers: Plant nutrients –Requisites of good fertilizers Effect of Nitrogen on plant growth, deficiency symptoms - Nitrogenous fertilizers: Classification with examples - Effect of Phosphorous on plant growth, deficiency symptoms – Posphatic fertilizers - Classification with examples - Effect of Potassium on plant growth, deficiency symptoms - Potassium fertilizers: Classification with examples – Complex and Mixed fertilizers (mere explanation) – Functions of micro nutrients

Unit II

Mannures: Farm yard manure–Compost making – Green manuring - Concentrated organic manures: Oil cakes ,Blood meal, Fish manure, Horn & Hoof meal, Protein – Difference between fertilizer and manure – Superiority of manure over fertilizer Bio fertilizers: Rhizobium, Azospirillum, Azatobacter, Cyani bacteria, Phospho bacteria

Pesticides: Clssification on the basis of mode of action, types of pests and Chemical nature with examples – safety measures while using pesticides - Organic insecticides: Nicotine ,Pyrethrum ,Rotenone, Petroleum oils, Summer oils , Dormant oils and spry oils – Uses of Inorganic pesticides (Arsenials, Fluorides and Borates) – Actions of DDT, Methoxy Chlor,BHC,Chlordan,Endosulfan, Organic Phosphide compounds
Fungicide, Herbicides, Acaricides, Rodenticides ,Attractants, Repellants, Fumigants, Defoliants (Definitions and Examples)

Act laws of insects and insecticides.

Chemical aspects in Agriculture

Reference

1. N.C.Brady, the Nature and properties of soils Eurasia publishing house, (p) Ltd. 9th Ed. (1984).
2. Biswas, T.D. and Mukeherjee S.K. Text book of soil science (1987).
3. A.J.Daji A Text book of soil science –Asia publishing house, Madras (1970).
4. Donahue, R.L.Miller, R.W.and shickluna, J.C. Soil – An introduction to soil and plant Growth – Prentice Hall of India (P) Ltd., New Delhi(1987).
5. Colling, G.H. Commercial Fertilizers – McGraw Hill Publishing Coo., New York(1955)
6. Tisdale, S.L.Nelson , W.L. and Beaton , J.D. Soil fertility and fertilizers. Macmillan publishing company, New York (1990).
7. Hesse, P.R..A text book of soil chemical analysis John Muray, New York (1971).
8. Jackon, M.L., soil chemical analysis. Prentic Hall of India, New Delhi (1958).
9. Buchell, K.H.. Chemical of pesticides – John wiley &Sons, NewYork (1983).
10. Mcinikov, N.N. Chemistry of pesticides Vol.36 of Residue Review-springer verlac, New York (1971).

Course Outcome:

To get the basic knowledge and operational capacity for the understanding of the major functional and molecular processes in plants.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
V	**17U5CHSSD**	**SOFT SKILLS DEVELOPMENT**	**1**	**-**

Unit : I

Proficiency in English – Group Discussion - Interview – Presentation Skills – Percentage and its application – Error Correction.

Unit : II

Communication Skills – Art of Listening, Art of Reading, Art of Writing. Corporate Skill – Time Management, Stress Management.

Text Books

1. Meena K and Ayothi (2013) A Book on Development of Soft Skills (Soft. Skills: A Road Map to Success) P.R. Publishers & Distributors, No. B -20 & 21 V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli – 620002.
2. Hariharan S, Sundararajan N and Shanmugapriya S.P. (2010) Soft Skills, MJP Pubglishers, Chennai – 600 005.

References

1. Alex K (2012) Soft Skills – Know yourself & Know the world, S.Chand & Company LTD. Ram Nagar, New Delhi – 110 055.
2. Martin Avis, Effective Time Management Skills for everyone, Avis Consultancy, London.

Course Outcome:

Developing organizational behavior and employment skills to the employment organizations

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
VI	**17U6CHC9**	**Organic Chemistry – II**	**5**	**6**

UNIT - I

Carbohydrates: Classification - properties , structure and configurations of mono saccharides (glucose and fructose) - interconversion - ascending and descending series - mutarotation, epimerisation - determination of ring size of glucose - cyclic forms of other mono saccharides - structural elucidation of sucrose, maltose – structures of starch and cellulose – properties of starch – glycogen, innulin, cellulose nitrate, cellulose acetate and mercerized cotton (simple treatment).

UNIT - II

Amino acids: Classification, general methods of preparation and reactions of amino acids, zwitter ion - isoelectric points, action of heat on ά, β and γ amino acids.

Peptides and proteins: Peptide linkage - polypeptide - end group analysis - synthesis of peptides - Merrifield synthesis.

Proteins: Classification - denaturation - colour reactions – primary, secondary and tertiary structures

Vitamins: Classification, biological importance of vitamins A, B_1, B_2, B_6, B_{12} and C.

UNIT – III

Alkaloids: isolation, physiological activities -classification, general methods of elucidating structure - structural elucidation and synthesis of coniine, nicotine and piperine

Terpenes: classification - isoprene rule, general methods of structural elucidation - synthesis and uses of citral , geraniol, nerol, ά – terpeniol and menthol,.

UNIT - IV

Molecular rearrangements: Types of rearrangements (nucleophilic and electrophilic). *Mechanism with evidence for the following re-arrangements*: pinacol - pinacolone, benzil- benzilic acid, benzidine, Claisen, Fries, Hofmann, Curtius, Lossen, Beckman, dienone – phenol.

UNIT - V

Phenols: Classification and nomenclature – esterification , halogenation, coupling with diazonium salt, Kolbe, Reimer Teimann, Gattermann, Houben Hoesch, Lederer Manasse reactions(mechanism not needed) and uses **.** *Cresol (o,m and p), Nitrophenol and Amino phenol* : preparation and properties.

Nucleic acids: Structure 0- purine and pyrimidine bases – nucleosides, nucleotides – DNA and RNA – structure and functions.

Enzymes: Introduction, classification – Mechanism of enzyme action, Factors affecting enzyme activity.

Books for Reference:

1. Finar I.L, Organic Chemistry, Vol 1&2, 6th edition, Addison Wesley. Longman Ltd., England (1996).
2. Morrison R.T., Boyd R.N., Organic Chemistry, 6th edition, Allyn & Bacon Ltd., New York (2006).
3. Bahl B.S, Arun Bahl, Advanced Organic Chemistry , 12th edition, Sultan Chand and Co., New Delhi (1997).
4. Pines S.H., Organic Chemistry, 4th edition, McGraw - Hill International Book company, New Delhi (1986).
5. Seyhan N. Ege., Organic Chemistry, Houthton Mifflin Co., New York, (2004)
6. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son, New Delhi (2007)
7. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
8. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India)Pvt.ltd., Hyderabad(2008).
9. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition,S. Chand & Coy Ltd., NewDelhi,(2006).
10. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Course Outcome:

- Students should able to understand the knowledge of fundamental concepts of carbohydrates.
- Students should able to learn about the chemistry of amino acids, proteins, nucleic acids and vitamins.
- Students should able to get knowledge to elucidate the structure of alkaloids and terpenoids.
- Students should able to learn about the various molecular rearrangement reactions.
- Students should able to know the nucleic acids, enzymes and phenol.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
VI	**17U6CHC10**	**Physical Chemistry – II**	**5**	**6**

UNIT - I

Ionic mobility: Transport number - Hittorfs rule - determination by Hittorf's method and moving boundary method - Kohlrausch's law and its applications (Determination of equivalent conductance of weak electrolytes,determination of transport number) - application of conductance measurements (determination of solubility product of a sparingly soluble salt and conductometric titrations) - elementary treatment of the Debye – Huckel- Onsager equation for strong electrolytes (no derivation) - evidence for ionic atmosphere - conductance at high frequencies (Debye - Falkenhagen effect) and at high fields (Wein effect).

UNIT - II

Electrochemical Cells: Galvanic cell **-** Daniel cell **-**half cell - Nernst equation of electrode potential – cell diagram and terminology - single electrode potential - sign convention - reversible and irreversible cells – types of electrodes (metal/metal ion, Gas, metal/insoluble salt and redox electrodes) – standard electrode potentials - standard hydrogen electrode – calomel electrode - electrochemical series and its significance - EMF of a galvanic cell and feasibility of cell reaction - calculation of thermodynamic quantities of cell reactions (ΔG, ΔH, ΔS and equilibrium constant).

Concentration cell: With and without transport- liquid junction potential. *Application of EMF measurements:* Valency of doubtfulion, solubility products , pH using hydrogen and quinhydrone electrodes, Potentiometric titrations (acid – base, redox and precipitation)

UNIT – III

Electromagnetic spectrum :The regions of various types of spectra.

Microwave spectroscopy: Rotational spectra of diatomic molecules treated as rigid rotator, condition for a molecule to be active in microwave region, rotational constants (B), and selection rules for rotational transition - frequency of spectral lines, calculation of inter - nuclear distance in diatomic molecules.

Infrared spectroscopy : Vibrations of diatomic molecules - harmonic and unharmonic oscillators, zero point energy, dissociation energy and force constant, condition for molecule to be active in the IR region, selection rules for vibrational transition, fundamental bands, overtones and hot bands, diatomic vibrating rotator - P,Q,R branches - determination of force constant.

UV visible spectroscopy: conditions Franck-Condon principle – pre dissociation.

UNIT - IV

Raman spectroscopy: Rayleigh scattering and Raman scattering. Stokes and antistokes lines in Raman spectra, Raman frequency, quantum theory of Raman effect, condition for a molecule to be Raman active - comparison of Raman and IR spectra-structural determination from Raman and IR spectroscopy, rule of mutual exclusion.

NMR spectroscopy : Nuclear spin and conditions for a molecule to give rise to NMR spectrum- theory of NMR spectra, number of NMR signals, equivalent and non - equivalent protons, position of NMR signals, shielding, de-shielding, chemical shift δ and τ scales. Peak area and number of protons - splitting of NMR signals - spin - spin coupling.

UNIT – V

Photo Chemistry : Consequences of light absorption - Jablonski diagram- radioactive and non - radioactive transitions (fluorescence, phosphorescence) - Lambert – Beer, Grothus - Draper and Stark – Einstein law - quantum efficiency - photo chemical reactions - kinetics of H_2-Cl_2 and H_2-Br_2 reactions - comparison between thermal and photochemical reactions - photo sensitization and quenching - chemiluminescence - lasers (simple treatment) and its application.

Macromolecules: Molecular weight of macro molecules – determination of molecular weight by osmotic pressure and light scattering methods.

Books for Reference:

1. Maron S.H. and Lando J.B., Fundamentals of Physical Chemistry, Mac Millan & Co. Ltd., London
2. Glasstone S. and Lewis D., Elements of physical Chemistry, Mac. Millan & Co. Ltd., London
3. Khterpal S.C. Pradeeps, Physical Chemistry, Volume I & II, Pradeep publications Jalandhur, (2004).
4. Jain D.V.S and Jainhar S.P., Physical chemistry, Principles and problems, Tata Mc Graw Hill, New Delhi, (1988).
5. Puri B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry, 23rd edition, Shoban Lal, Nagin Chand & Co., New Delhi, (1993)
6. Atkins P.W., Physical Chemistry, (5th edition) Oxford Uiversity Press. (1994)
7. Castellan G.V., Physical Chemistry, Orient Longmans. New Delhi.
8. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand & Son,New Delhi (2001)
9. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition, S.Chand & Company Ltd., New Delhi, (2008)

Course Outcome:

- Students should able to learn about the basics of electrochemistry and practical use of electricity and their laws.
- Students should able to understand about the nature of electrolytes, their theories, concept of emf and its application.
- Students should identify about the use of ultra violet spectroscopy and infrared spectroscopy.
- Students should able to know the steps in photo chemistry and the direct and indirect uses of photo chemistry.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6CHC11**	**INORGANIC CHEMISTRY - II**	**5**	**5**

UNIT I

Nuclear Chemistry–I: Nuclear particles **-** composition of nucleus - nuclear forces - packing fraction - mass defect - binding energy - nuclear stability - shell and liquid drop nuclear models – magic numbers. *Isotopes*: Detection and separation - deviation of atomic weights from whole numbers – isobars, isotones and mirror nucli.

UNIT II

Radioactivity :Discovery - α, β, γ rays –detection (by Wilson cloud chamber) and measurements (Geiger – Muller counter) of radiation - group displacement law - rate of disintegration - half life and average life, - radioactive series - nuclear transmutation – types of nuclear transmutations - particle accelerators (cyclotron only) - nuclear fission- nuclear reactors – fast breeder reactor (FBTR) – atom bomb – nuclear fusion – hydrogen bomb - applications of nuclear science in agriculture and medicine- carbon dating - rock dating.

UNIT III

Structure of alloys: Substitutional and interstitial solid solutions - Hume Rothery ratio.

Semi conductors: Extrinsic and intrinsic, n-type and p-type, transistors – uses.

Solvents for inorganic reactions: Definition and examples of protic, aprotic, polar, non-polar, non-aqueous solvents.

Acid Base - Theories of acids-bases- Arrhenius, Bronsted – Lowry, Lewis, Solvent system (levelling and differentiating effect), Lux - Flood and Usanovich definition – HSAB principle.

UNIT IV

Fossil fuels : Varieties of coal and petroleum - petroleum refineries in India.*Fuel gases*: Calorific value – units of heat - composition and preparation of water gas, semi water gas, carbureted water gas, producer gas, natural gas, LPG and biogas.

Fertilizers: Essential nutrients for plants –functions N,P,K nutrients- manufacture of urea, calcium superphosphate, potassium sulphate and mixed fertilizers - micronutrients and their role in plant life.

Pesticides: Insecticides (stomach & contact poison and fumigant), fungicides, herbicides, rodenticides and their adverse effect – alternative methods for pest control.
Safety matches, **fireworks**: Manufacturing details

UNIT V

Cement: Classification – functions of ingredients of Portland cement - manufacture – Chemistry of setting of cement

Glass: Manufacture-different types of glasses – uses.

Paints and varnishes: Constituent's oil paint –paint pigments –mechanism of drying - **Special paints**: Heat resistant, fire retardant, chemical resistant, temperature

indication, luminous, water repellent, anti fouling paints.-oil and spirit varnishes-enamels and lacquers.

Water pollution: Various water pollutants (sewage, infectious agents, plant nutrients, exotic organic chemicals, inorganic minerals and chemical compounds) and their adverse effect.

Books for Reference:

1. Soni P.L., Text book of Inorganic Chemistry, S.Chand & Co, New Delhi (2006)
2. Lee J.D., Concise Inorganic Chemistry, Black well science, UK (2006).
3. Puri B.R. and Sharma L.R., Principles of Inorganic Chemistry, Soban Lal Nagin Chand & Co. New Delhi,
4. Satyaprakash, Tuli, G.D., Basu, S.K., and Madan, R.D,] Advanced Inorganic chemistry (vol I & II), S. Chand, New Delhi (2006)
5. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)

Course Outcome:

- Students should able to learn about the fundamentals of nuclear chemistry.
- Students should become aware of the chemistry of radioactive elements.
- Students should able to study about theories of acid and bases.
- Students able to understand about glass and alloys preparation, uses and their applications.
- Students should able to identify about polymers, fibers, cements preparation, uses and their applications.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
VI	**17U6CHCP5**	**Gravimetric and Organic preparation practical**	**5**	**5**

A. Gravimetric Estimation:

1. Estimation of Barium as Barium chromate
2. Estimation of Barium as sulphate.
3. Lead as chromate.
4. Lead as sulphate.
5. Estimation of Calcium as oxalate mono hydrate
6. Nickel as Di Methyl Glyoxime complex
7. Magnesium as magnesium or oxinate.
8. Copper as cuprous thiocynanate.
9. Estimation of chloride as silver chloride.

B. Organic preparation:

1. Oxidation: Benzoic acid frombenzaldehyde
2. Hydrolysis:Salicylic acid from salysilaldehyde
3. Nitration : m-Dinitro benzene from nitro benzene
4. Nitration: Picric acid from phenol
5. Bromination:Tri bromo aniline from aniline
    i. Tri bromo phenol from phenol
    ii. p- Bromo acetanilide from acetanilide
6. Osazone from glucose

Reference:

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Course Outcome:

- Students learn the techniques of gravimetric analysis.
- Students learn the methods of preparing organic compounds.

Semester	Subject code	Title of the paper	Hours of Teaching / Week	No. of Credits
VI	**17U6CHEL3A**	**Major Elective – III INDUSTRIAL CHEMISTRY**	**4**	**4**

Unit - I

Basic ideas about unit operation – Flow chart- Chemical conversion- Batch versus contion processing – chemical process selection- Design – Chemical process control – chemical process economics – Market evaluation – Plant location- Management for productivity creativity- Research & Development and its role in chemical industries.

Unit - II

Water conditioning for chemical factories – rease – methods of conditioning – demineralisation – Precipitation- Desalting – Industrial and sewage water - water treatment.

Unit - III

Pulp and paper industries – Sulphite, sulphate, soda, ground wood pulp for paper = Manual of paper – specialty paper – paper – paper stock – structural Boards,] Plastics – Manufacture – resin – Manufacturing process – Condensation Polymerization Manufacture of laminates and other derivatives – Hexamethylene tetramine plastics – esters.

Unit - IV

Rubber industries – natural – synthetic rubber – Monomer production – Synthetic polymerization – Butadiene – Styrene copolymers – Butadiene acrylonitrile copoly Neoprene – Thiokol – Silicon rubber – Butyl rubber – Urethane rubber – Rubber pre chemicals – Rubber compounding – Rubber fabriation – Latex compound – reclaimed Rubber – derivatives.

Unit - V

Sugar – manufacture – starch and related products – miscellaneous starch. Manufacture of industrial alcohol – Butanol – Acetone – Vinegar – Acetic acid – Citric and Lactic acid all by fermentation.

References:

1. Norrish Shreave. R. and Joseph A. Brink Jr Chemical Process Industries, McGraw Hill, Industrial Book Company London.
2. Brain A.C.S. Reinhold, Production and properties of Industrial chemicals –– New York.
3. Burgh, A. Fermentation Industries, Inter science, New York.

Course Outcome:

- Students should able to identify side effects of cosmetics and perfumes.
- Students should able to understand adverse effects of pesticides.
- Students should able to learn about production of organic material from fermentation Industries.
- Students should able to understand the process of pulp, paper industries and rubber industries.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
VI	**17U6CHEL3B**	**Major Elective – III FOOD AND NUTRITION**	**4**	**4**

Objectives:

1. To learn the importance of food and nutrition
2. To know the chemical composition and importance of balanced diet
3. To learn the food adulterants and identification of them

Unit - I: Food, nutrition and health

The meaning of food, nutrition, nutritional care and health-nutritional problems in India.

Unit - II: Biological importance of food

Nutritional classification of food-nutrients as body constituents-digestion and absorption of food. Types of food, caloric content and dieting.

Unit - III: Basic chemical constituents of food

Biological functions of carbohydrates, proteins, fats, vitamins, minerals and water.

Unit - IV: Food adulteration testing

Common adulterants in food-testing methods of all food adulterants.

Unit - V: Health problems of food adulteration

Principal adulterants and their health effects.

References

1. Alex Ramani V, Food Chemistry, MJP Publishers, Triplicane, Chennai, 2009.
2. Thangamma Jacob, Food adulteration, Macmillan company of India limited, New Delhi, 1976.
3. Jeyaraman J, Laboratory manual in biochemisty, Wiley Eastern limited, New Delhi, 1981.

Course Outcome:

- Students should able to learn about the importance of food and nutrition.
- Students should able to know about the chemical composition and importance of balanced diet.
- Students should able to identify the food adulterants and identification of them.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
VI	**17U6CHEL4A**	**Major Elective – IV DYE CHEMISTRY**	**4**	**3**

Unit - I

Basic concepts of colour chemistry: Colour and sensation - theories of colour and chemical constitution – Witt's theory - chromophore - auxochrome – chromogen – batho chromic and hypsochromic shifts – resonance and valence bond theories – requirements of a dye - classification of dyes based on their their structures and use.
Synthesis of few dyes: Bismark brown, Congo red, Malachite green, Crystal violet, Magenda (Rosaniline), Alizarin, Indigo dyes and fluorescein.

Unit - II

General properties of dye stuff: Linearity, co-planarity -Washing, light, rubbing and sweating, gas fading and sublimation fastness,
Fiber Science : classification fibres –– properties such as count, denier , tex, staple length, spinning properties, strength, elasticity and creep - general characteristics of cotton, silk and wool - chemical natures of cellulosic and proteneous fibers - preparation and properties of nylon 6,6, polyester, viscose.

Unit - III

Pretreatment of fibers : Singing – Singing techniques - sizing & desizing - hydrolytic and enzymatic desizing methods - scouring - Kier boiling method - bleaching methods (with hypochlorite, peroxide, and bleaching powder) – mercerization .
Technical terms in dyeing: M.L.ratio – % of shade – % of exhaustion – equilibrium absorption. **Dye bath assistants**: Exhaust agents and their mechanism - wetting agents (TR oil) and leveling agents (anionic, cationic and non-ionic) with their mechanisms.

Unit - IV

Dyeing processes -I: *Vat dyeing*: Vatting, dyeing, oxidation and after treatment steps. *Reactive dyeing*: Hot and cold brand reactive dyes – principles involved in the dyeing process. *Dyeing of polyester:* principle – carrier dyeing – functions of carrier – functions of dispersing agents - high temperature dyeing. *Ingrain dyes*: azoic colours with one example.

Unit – V

Dyeing processes - II: *Acid dyeing***:** Mechanism of acid dyeing – role of electrolytes . *Mordant dyes*: chrome mordant process. *Oxidation colours*: Aniline black and dyeing of mineral khakhi and *Combination shades*.
Textile finishing: Water proofing, moth proofing proofing , mildew and fire proofing
Dyeing machineries: Padding mangle, Jigger, Winch and soft flow machines.
Non textile uses of dyes: Leather dyeing, paper dyeing, solvent dyes ,food colours, hair colours and fluorescent brightening agents

REFERENCE:

7. V.A.Shenai, An introduction to dyes stuff and intermediate–Sevak publication, Mumbai.
8. V.A.Shenai , vol. IV, Technology of textile processing, Sevak publication , Mumbai.
9. V.A.Shenai, vol. I, Textile fibres, Sevak publication , Mumbai.
10. V.A.Shenai, vol.III , Techniques of bleaching, Sevak publication ,Mumbai.
11. V.A.Shenai , vol.II, Principle of dyeing , Sevak publication, Mumbai.
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition,Sultan Chand & Son, NewDelhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry,Vishal Publishing Co., Jalandar, (2012)
14. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition, S.Chand & Coy Ltd., NewDelhi,(2006).
15. Abraha. E.N.Dyes and their intermediates-, Bergamon Press, 1969.
16. Lubs. H.A, The chemistry of synthetic dyes and pigments-,ACS Publication, Halner, 1970.
17. Venkataraman . K. The chemistry of synthetic dyes Vol, I, II, III & IV-, Academic Press N.Y., 1949.
18. http://en.wikipedia.org/wiki/Hair_coloring
19. http://www.pbm.com/~lindahl/articles/food_coloring_agents.html
20. http://en.wikipedia.org/wiki/Food_coloring

Course Outcome:

- Students should able to learn about the main purpose of dyeing and how fabrics are dyed in industry.
- Students should able to understand the dyeing is the application of pigments on textile materials.
- Students should able to know about dyes may require a mordant to improve the fastness of the dye on the fiber.
- Students should able to learn that pretreatment is a heart of processing of textile. Ameplding the soil recalamation of Acid soil liming Agents.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
VI	**17U6CHEL4B**	**Major Elective – IV CLINICAL CHEMISTRY**	**4**	**3**

Objectives:

After going through the course the student is expected to learn about

1. The disinfectants and antiseptics.
2. The important drugs and the mode of actions.
3. Enzymes
4. Body fluids

UNIT-1: CLINICAL HYGIENE AND BIOCHEMICAL ANALYSIS

Definition of health. Ryde of WHO. Sterilization of surgical instruments. Disinfectants, antiseptics, sanitation. Biochemical analysis of urine, serum and fecal matter. Treatment for specific poisons-acids, alkalis, arsenic and mercury compounds.

UNIT-2: COMMON DRUGS

Manufacture of drugs (e.g. quinine, reserpine, atopside and d – tubocurarine) from Indian medicinal plants. Testing of drugs : biological variation, screening and toxicity. Use of pharmacoepia and therpeutic index. Types of drugs and their modes of action : Depressant drugs (special reference to sedatives and hypnotics). Anticonvulsant drugs (sodium valproate, hydantoins). Narcotic analgesics (only morphine compds). Antipyretic analgesics (acetyl salicyclic acid, p – amino – phenol derivatives).
Muscle relaxants.

i. Acting at neuromuscular junction (d – tubocurarine chloride).
ii. Acting at spinal cord alone (glyceryl guaiacolate, diazepam).
Antibiotics (pencillin, streptomycin, tetracyclin, chloramphenicol)
Cardiovascular drugs-nitrates, beta blockers(propranalol and atinelol) and calcium channel blockers.
h) uclear medicine (Radiation therapy)

UNIT-3: ENZYMES

Classification, specificity. Coenzymes, Cofactor, ATP, Mechanism of enzyme action and Immobilisation of enzymes.

UNIT-4: BODY FLUID

Blood volume, blood groups, coagulation of blood. Plasma lipo protiens. Blood pressure. Arteriosclerosis, diseases afecting red cells: Hyperchromic and hypochromic anaemia. Blood tranfusion. Blood sugar and diabetes.

UNIT-5: BIOTECHLONOGY:

Heredity, recombinant DNA, Genetic engineering and its possible hazards, Gene splicing, manufacture of interferon and human insulin(Humulin), Drug manufacture based on fermentation(only antibiotics)

Text Books

Jayashree Ghosh, A text book of Pharmaceutical Chemistry, S.Chand and Co. Ltd, 1999.
S.C. Rastogi, Biochemistry, Tata McGraw Hill Publishing Co., 1993
Ashutosh Kar, Medicinal Chemistry, Wiley Eastern Limited, New Delhi, 1993.

Reference Books

1. O.Le Roy, Natural and synthetic organic medicinal compounds, Ealemi., 1976.
2. B.L. Oser, Hawk's physiological chemistry, 14th edition, Tata-McGraw - Hill

Publishing Co.Ltd, 1965.

Course Outcome:

- Students should able to learn about the application of disinfectants and antiseptics.
- Students should able to know about the importance of drugs and the mode of actions.
- Students should able to learn about Enzymes, Body fluids and Biotechnology.